Nature Magazine

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DECEMBER 1941

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Camera Trails

BY NORRIS W. HARKNESS

Portraits for Christmas

Many of the faces around us may not seem too natural or especially beautiful, but they furnish the Nature photographer his most fascinating subject matter. Yet most less-experienced amateurs are afraid of portraiture. They feel that the technique of recording on film and paper the faces of their friends is beyond them, even though they may undertake far more difficult kinds of pictures without a qualm.

We realize that the exposure question is simple as compared to that involved in photographing the bark on a tree, and we know that the focusing is like any other, and that we need no great amount of depth of field, but we often fail to remember that one simple thing makes the difference between a snapshot and the kind of portrait we would like to make. Perhaps I ought to say "two things" for they are almost equally important.

They are the direction of the light and the expression that we catch. The expression is the more important of the two. However, the light direction has a real bearing on the expression, so let us consider them more or less at once.

As a starter, let us see how we usually make an outdoor portrait. We stand our subject stiffly in the full glare of the sunlight with the sun directly behind the camera. Our subject stares straight into the lens—squints is a better word for it because few people can look so nearly into the sun without twisting their faces all out of shape. Then, while they look as self-conscious as possible and assume that "I'm having my picture taken" look, we snap the shutter—and everyone knows the dreadful things that usually result.

Why not try some method like this? Let your subjects find a comfortable place to sit—a low wall is splendid. While they get set and find a natural position with no suggestions from us, we pick a viewpoint that gives us a side-lighting with the sun perhaps forty-five degrees away from the line of the camera. We check the background carefully to make sure there is nothing that will interfere with the effect of the final picture, and, if we choose a low camera angle to put our subjects against the sky, we use a filter to darken it. We focus carefully and recheck the background details, and then start talking on any subject that may interest our sitter.

With those who have posed before we may be able to suggest definite poses, but generally we will do better to let them fall into one that is perfectly natural because they themselves found it. Then, when everything in the pose and the expression looks right, we press the button—and the shot is made. A whole series will be good insurance. The effect of the shot depends so completely on the expression that we need several chances to catch it just as it ought to be. It may take an hour to get what we want, but, once on film, we have something real and valuable.

Then make the prints carefully. Perhaps the effect will be better if we let the light fall on the printing paper through a hole in a card that we move up and down during the exposure to vignette the face and make the edges of the print fade off into clear white, but even a straight print will make a more than acceptable gift for Christmas. If it is enlarged, put it in one of the inexpensive mounts used by the professional photographer. It adds much to the impression of the picture.

Here are a few pointers for those who have not tried outdoor portraits before. Stay at least four feet from your subject to avoid too much distortion; focus on your subject's eyes if you are using the diaphragm wide open, and focus carefully, even measuring the distance rather than guessing at it. Hold the camera steady, but above all, avoid cluttery backgrounds and catch that expression. And keep trying.

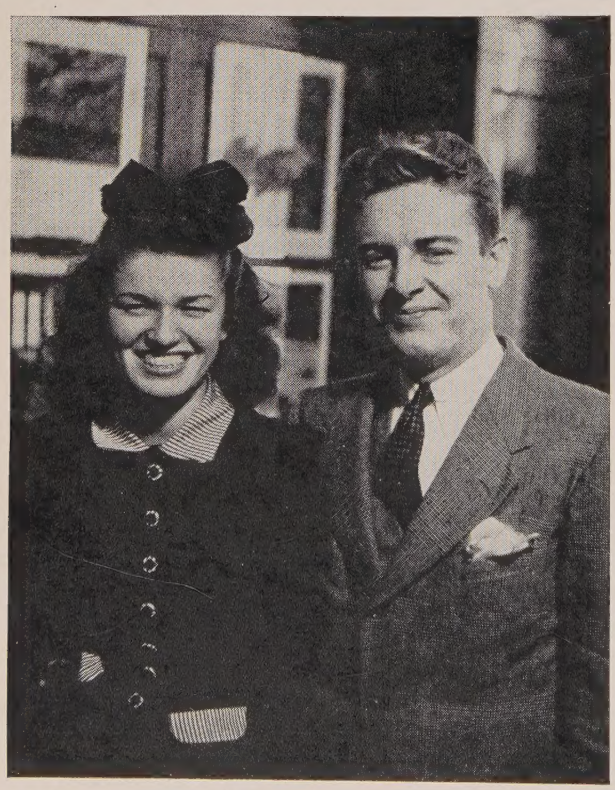
The Problem Corner

F. E. S., Hamden, Connecticut, asks: "Will you please tell me what filter I should use to bring out gray clouds on an overcast day when the sky is gray too. There is little difference between the clouds and sky, but I can see the clouds and want to show them in the pictures."

ANS.—Since the action of a filter is to absorb or hold back some part or parts of the light reaching the camera from the object, it will have the same effect on both the clouds and the sky whose colors are too much alike to be separated by any filter. There is little to be done about it, and any filter will only require more exposure without appreciably changing the tones in the heavens. The filter brings out clouds on a clear day by holding back the blue component of the light. When the blue is already absorbed by the high clouds and mist, a filter is useless.

C. R. J., Eustis, Florida, writes that he has two very old cameras that he has not used in twenty years or more and asks where he might trade them in on a more modern machine for Nature work.

ANS.—Old cameras bring little on the present market unless their lenses are ex-



CONTRAST IN TYPES OF PORTRAITURE. AT THE LEFT THE SUBJECTS HAVE THAT "I'M HAVING MY PICTURE TAKEN" LOOK. AT THE RIGHT THEY HAVE ASSUMED A NATURAL POSE THAT IGNORES THE ACTIVITIES OF THE PHOTOGRAPHER.

ceptional—that is, cameras as old as yours. I suggest that you look up Herbert C. McKay, who now lives in Eustis and ask him about them. He knows more about photography than most people and I'm sure he will be glad to advise you.

A. L. M., Mobile, Alabama, asks: "What restrictions are in force in the Army camps around the country, and where can I get full information as to what pictures I may make on government property?"

ANS.—The rules covering photography in the various government reservations vary with the necessities of the individual camps. In some of them all photography is banned except with special permission from the commandant, and in others the amateur is almost free from any regulation. In any camp or other government property under present conditions you will be wise to consult the Public Relations Officer as soon as you enter the reservation and ask him what is allowed. Do not wait to ask until you have been stopped, but get his permit first. You will find all officials more than willing to cooperate to the best of their ability provided you show signs of willingness to cooperate with them.

R. N. K., Montreal, Canada, asks: "What is the law covering the photography of United States stamps."

ANS.—Reproducing stamps photographically to illustrate items for sale or exchange, and, greatly enlarged, to show the variations encountered, is becoming more and more important to amateur photographers. The United States law on such pictures says that no postage stamp may be photographed more than 75% or less than 1½ times its normal size. In other words, the photograph must be less than three-quarters actual size or more than one and one-half times as big as the stamp itself. Revenue stamps must also be defaced in some way. The safest is to place a white string across the face when making the exposure, although you might make either a scratch or a line across the negative. The authorities will be guided in their interpretation of the law by their opinion of your intentions, but penalties for any violations of the rules are heavy.

S. L., Houston, Texas, asks what he can do to make his enlarger light more even. It has a "hot-spot" in the center and prints darker there than around the edges of the negative.

ANS.—My diffusion type enlarger behaves as yours does and gave me trouble for a long time although the difference between the center and the corners is not great. I fixed mine by painting a black spot on the bulb opposite the hot-spot, and, after increasing its size several times from the quarter-inch spot I first made, I found that a dot about one inch in diameter did the trick. A metal disc clamped to the bulb with small wires might do the same thing and could be changed from bulb to bulb as they burn out.

This and That

Eastman Kodak has announced a new Kodaslide Projector, the 2A, with a 150-watt bulb, a choice of lenses, and a combination case that includes space for file boxes. The 2A replaces the model 2 for 2 x 2 inch slides. Another new Eastman product that should supply the answer to the Christmas present problem is the line of pocket cases, folders and albums especially designed to take the Minicolor prints announced by them some weeks ago. Minicolor prints, as you may remember, are two diameter enlargements of your Kodachrome transparemcies made at Rochester.

Castle Films issued a new catalog of home movie films in 8 and 16mm. sizes, with or without sound. For the first time you are offered cartoons in color. The News Parade of 1941 and the Football Thrills of 1941 are especially interesting. Their address is 30 Rockefeller Plaza if you want their catalog.

Ross Optical Tissue is the first advance in lens tissue in a very long time. It seems hard at first glance but is perfectly safe for any glass in lenses or in negative carriers in enlargers. It leaves no lint and rapidly absorbs grease from finger marks. Ross Tissue comes in a handy pocket package that you ought to have with you whenever you take the camera out. It is distributed by Raygram Corp., 425 Fourth Avenue, New York, if your dealer does not yet carry it.

A new booklet describing the use of films for documentary copying has been published by Dupont. It gives all information necessary for the exposure, development, and handling of copying films. For your copy, write Camera Trails and enclose a three-cent stamp.

Both Eastman and Agfa have brought out new Christmas card kits with masks, greeting negatives, and embossing tools. Your dealer has these kits, and others that will make the question of what to do about your cards simple. Camera Trails for December, 1938, carried a story on their making. But don't buy them unless you are ready to do a perfect job on every one you mail, and throw away all that have some flaw.

Remember, while you rummage through your negatives looking for the one to use on this year's card, that the Christmas time is the best to make another series of negatives to use next year. Around the holidays you have a natural setup that the professional spends hundreds of dollars to duplicate and usually his have a phony look. Shoot the Christmas morning scenes in stills or movies—they are one set of pictures that you will never want to lose.

And a very Merry Christmas to you with a Happy New Year filled with good pictures.

Camera Trails is conducted for the benefit of Nature photographers and operates a service to help you solve your photographic problems. The editor will also welcome any suggestions or criticisms. Address your communications to Norris W. Harkness, Nature Magazine, 1214 Sixteenth Street, N.W., Washington, D. C.

Oregon Audubonists

We have recently received a notice of the meetings of the Oregon Audubon Society for the 1941-42 season through May, 1942. A notable program has been arranged, and, in addition, weekly field trips will be scheduled. Outdoor lovers in the Portland vicinity are missing a lot if they are not affiliated with this group. They should get in touch with the Corresponding Secretary, W. H. Crowell, 1040 Pacific Building, Portland.

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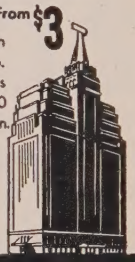

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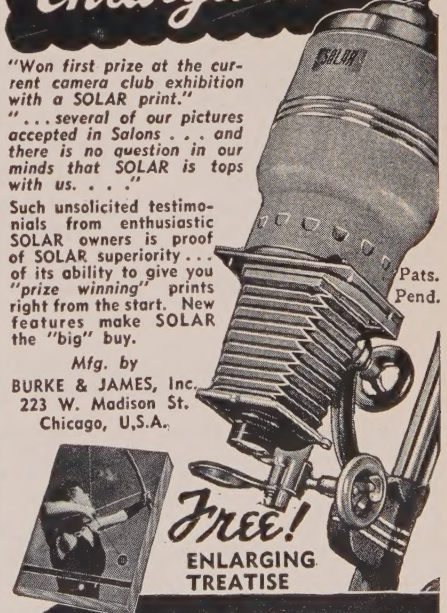

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Nature in Print

By HOWARD ZAHNISER

THERE are two obvious ways to happiness at the Christmas season. One of these, of course, is to give good gifts. The other, naturally enough, is to receive them. Most of us, however, think almost unconsciously in terms of three—the Trinity, the charming third time and so forth—just as Indians, I understand, think in terms of four. To us, three is the minimum essential, the number, as Donald C. Peattie says, "that will just enclose an area, just balance anything that can stand alone." So inevitably there is a third way to happiness at Christmas time, and that is to suggest good gifts to the would-be givers.

In my personal experience this last way has been the hardest. I never fail to receive more presents than my most extravagant expectations, and I never have any trouble giving gifts. But there seems to be no end to the perplexities that come with such questions as "What shall I give Theodore?", "Do you have any idea what Mildred wants for Christmas?", or "What would you suggest as a gift for an elderly man that is left-handed, already has an electric train, and never wears ear-muffs?" Anticipating the Yuletide season now, I find myself more concerned than ever with this catechism period that precedes the great day. Puzzling over this, I believe I have a solution—a three-in-one answer, as it were: Books.

A solution, that is, for me. Nothing adds more to my holiday cheer than a book, or two books, or as many as anyone might suggest. Not that I think dolls are folly, but simply because I like books. Furthermore, in this instance the general truth that it is better to give than to receive is well substantiated. I not only prefer to buy books for gifts; I even prefer giving to receiving them. (Of course, I would not give a book to anyone without reading it first.) Finally, then, if anyone asks me to solve the so-called "gift problem" this year I am going to suggest books.

During the past twelve months I have been reading a large number of newly-published volumes on the outdoors. Looking back over these works I find them varying from such a practical volume as *The Audubon Guide to Attracting Birds* to such a personal adventure narrative as *Sierra Outpost.* A few are outstanding in recollection, and some one or other of them seems to meet almost any adult taste.

A work of fiction that I fear has not been as widely read as its value merits is Judy Van der Veer's *November Grass,* not an exciting narrative but a beautiful work of prose fiction about a California ranch girl. "She cried for the strange beauty of the silent things on earth . . . for all who must live. . . . All winds are one wind, she thought, and all lives are one life. She knew why she trembled for hunted deer."

A volume that I predict would be read with great interest by many men and boys is Ernest Thompson Seton's *Trail of An Artist-Naturalist.* This account of an immigrant lad on a Canadian backwoods farm, who struggled for an education in Toronto and in art schools of London and Paris, pioneered in Manitoba and in the Southwest, and was lionized in New York for his outdoor tales, is a success story of high rank, illustrated with Seton's own art and interspersed with anecdotes and tales.

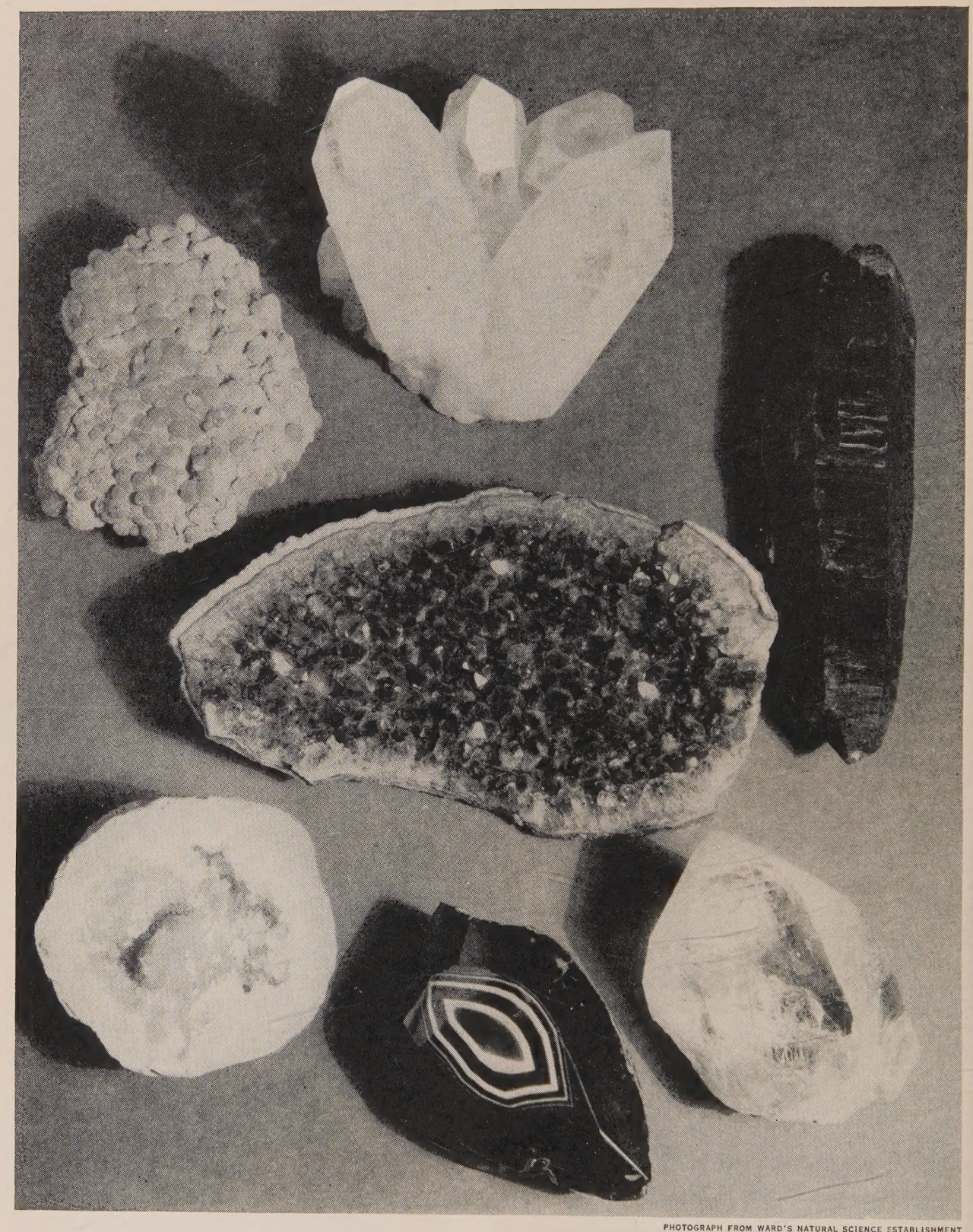
For those who like their biography more scholarly I would recommend Ernest Earnest's *John and William Bartram: Botanists and Explorers.* There are many readers, I surmise, who will enjoy deeply an excursion from 1941 into the eighteenth century world and a taste of the Bartram "gusto and humanity," compared by Professor Earnest to "a spring wind after a long winter." This biography, written in a lucid prose with the charm of the best literary essays, should hold its place well on a gift list.

For your really serious-minded conservationist friend the obvious choice is Dr. Ira N. Gabrielson's *Wildlife Conservation.* This book, which rises directly out of the author's experience as the nation's principal wildlife administrator, is in its own words, "an effort to put into simple language the basic facts in this field and to emphasize that various programs for the conservation of soil, water, forests, and wildlife are so closely interwoven that each vitally affects one or more of the others."

Those who have serious interests and yet enjoy having these served with entertainment will surely appreciate Willy Ley's *The Lungfish and the Unicorn: An Excursion into Romantic Zoology.* Replete with information, this collection of articles on forms of life that are mythical, extinct, remnants of near extermination, or strange survivors from past geological times, is one of the most entertaining of Nature books that I have read.

For those rare friends who enjoy contemplative reading in the journal tradition I would suggest August Derleth's *Village Year: A Sac Prairie Journal*—a volume in which one is conducted three times through the seasons by a writer who seems entirely undisturbed by the rush of the twentieth century, completely at ease to observe brooksides made white and green by dutchman's breeches, or to perceive the essential characteristics of his fellow villagers. Accounts of seasonal interest are Derleth's records of his attendance at the annual Christmas Eve church program, which he says "though never notable for the performers, is always memorable for the performance . . . pants-hitcher-uppers, skirt-lifters, handkerchief-twisters . . . parents . . . with eyes only for their own children."

Much different were the Christmas Eves spent by the Lofbergs during the nine winters that are chronicled in *Sierra Outpost,* by Lila Lofberg and her helper in authorship, David Malcolmson. Mrs. Lofberg spent these winters snowbound in the Sierras, nearly 8000 feet above sea level, with her husband who was stationed there by an electric power company. Notable in many ways, the Lofbergs' experiences become of special interest because of their associations with wildlife, including coyotes that came regularly to their feeding stations. Mrs. Lofberg's carefully considered observations of the coyotes and other creatures make her book one of importance as well as interest. For this reason and because of its deep winter setting it should go well under (Continued on page 578)



PHOTOGRAPH FROM WARD'S NATURAL SCIENCE ESTABLISHMENT

A VARIED ARRAY OF QUARTZ CRYSTALS

In the center is a geode of quartz of the amethyst variety from Brazil. Reading clockwise from the upper left corner we find chalcedony quartz from Utah; rock crystal quartz from near Hot Springs, Arkansas; smoky quartz from Butte, Montana; a quartz crystal from Minas Geraes, Brazil; agate quartz from Serra do Mar, Brazil, and a quartz geode from Illinois

NATURE MAGAZINE
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Commerce, art, religion, medicine, history and politics have felt the touch of—

The Quartz Crystal

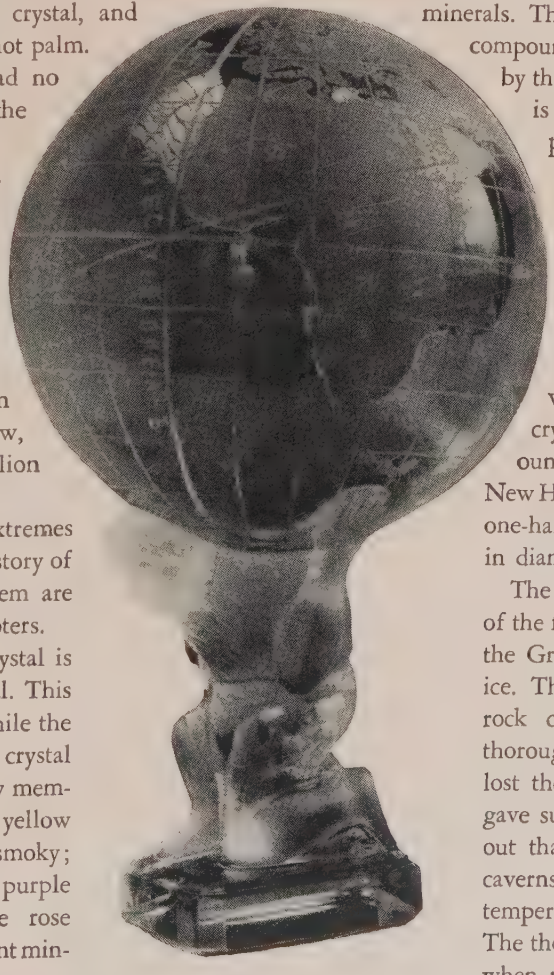
By DONAL HURLEY

STOOPING, the farm boy picked up the stone that lay sparkling in the cowpath. He turned it in his hand, watching the rays of the late sun glisten and dance on the smooth faces. The lad admired the clear, transparent beauty of the rock crystal, and wondered at its coolness in his hot palm. It was pretty, but to him it had no value and he tossed it down by the path.

Another boy stood before a glass case in the National Museum in Washington, gazing raptly at a perfect sphere made from the flawless rock crystal. It was a ball only twelve and seven-eighths inches in diameter, weighing one hundred and seven pounds. Its value, the boy knew, was estimated at a quarter million dollars. He longed to touch it.

These two incidents suggest extremes of importance in the fascinating story of quartz crystals, and between them are many alluring and fantastic chapters.

The purest form of quartz crystal is the clear, transparent rock crystal. This is the aristocrat of the family, while the black and nearly opaque smoky crystal is the poor relation. Other family members include crystals such as the yellow citrine; another that is brownish-smoky; one that is whitish-milky; the purple amethyst; the exceedingly rare rose quartz crystal. A thousand different mineral inclusions and associations; more than a hundred and forty different crystal faces; bubbles of liquid or gas; a multitude of twining types; etchings and other variations in crystal character—all are related both to the stone in the cowpath and the sphere in the museum case. But irrespective of a wide range of differences, all quartz crystals belong to the hexagonal system of minerals. They have in common a chemical compound of silicon dioxide expressed by the formula SiO_2. When the crystal is perfectly formed it is a six-sided prism terminated at each end by a six-sided pyramid, and facial angles are constant regardless of crystal size or shape.

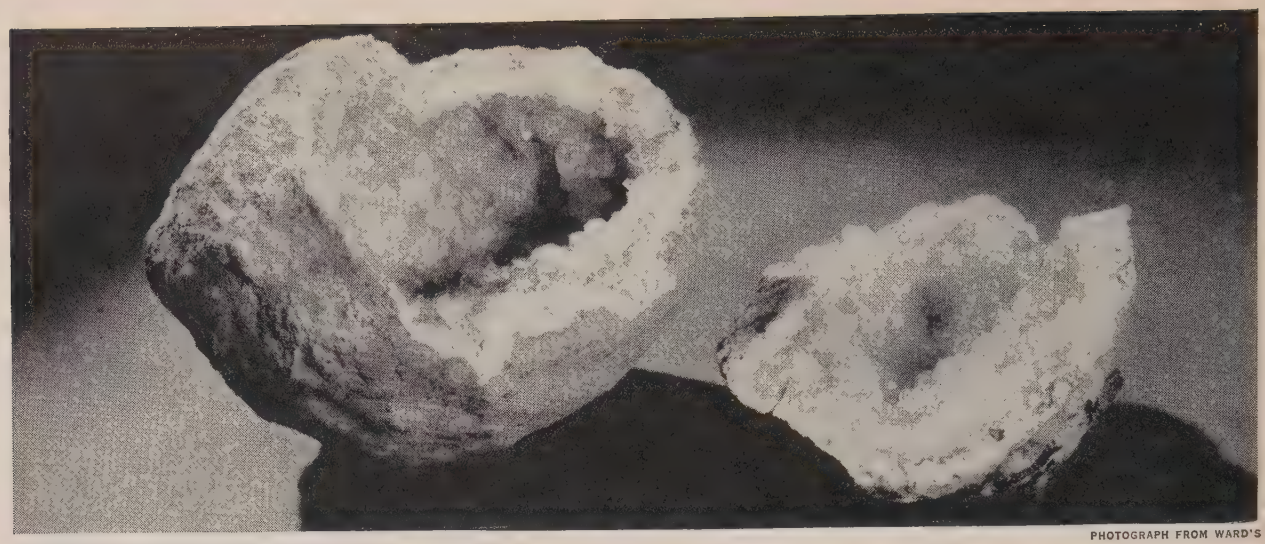


CARVED ATLAS IN QUARTZ
This delightful piece is of Russian origin, and is displayed at the American Museum of Natural History in the collection there

Quartz crystals are found in almost every type of rock, in most geological ages, and in practically every part of the world. They include microscopic crystals, 100,000 of which weigh an ounce, and such giants as the Grafton, New Hampshire crystal, which is six and one-half feet long, one and one-half feet in diameter, and weighs 2913 pounds.

The rock crystal, which is the trunk of the family tree, derives its name from the Greek word "krustallos", meaning ice. The ancient Greeks declared that rock crystals were pieces of ice so thoroughly frozen as to have forever lost the power of melting. St. Jerome gave support to this belief by pointing out that rock crystals formed in dark caverns of the high mountains where the temperature was always intensely cold. The theory lost caste, however, in 1676, when rock crystals were brought from the tropics.

Man probably admired and used the quartz crystal during the Stone Age.



PHOTOGRAPH FROM WARD'S

A QUARTZ GEODE FROM WARSAW, ILLINOIS

Quartz crystals are found in almost every type of rock, in most geological ages, and in practically every part of the world. They range from the minute to the gigantic

However, its first important recognition was for its ornamental value, coming with the mastering of the art of cutting and polishing rock crystals into seals, rings, beads and other jewelry by the Sumerians, earliest inhabitants of Mesopotamia. About 200 B.C. the Egyptians improved the crude jewelry of the time and brought this art to a much higher level. Their traders plied along the coast of Africa and up the rivers, while the Phoenicians sailed the Mediterranean, bartering goods, including rock crystal jewelry, with the Greeks for wine from their grapes. Barter carried the rock crystal from Greece to Rome, where it gained high favor. Roman craftsmen made wine jugs, cups, vases, and dishes from the beautiful and transparent stone. Ownership of rock crystal vessels was a standard of prosperity in Roman times. The Emperor Nero had two large goblets carved from crystal and engraved with subjects from the Iliad. In one of his sudden furies he dashed those rare and beautiful crystals to pieces on the floor.

Other notable works of rock crystal art included a casket engraved with scenes from the Passion of our Lord, now in Florence; a set of chessmen in the Hotel de Cluny; vases encrusted with precious gems, formerly in the imperial treasury of Turkey. All are supremely beautiful.

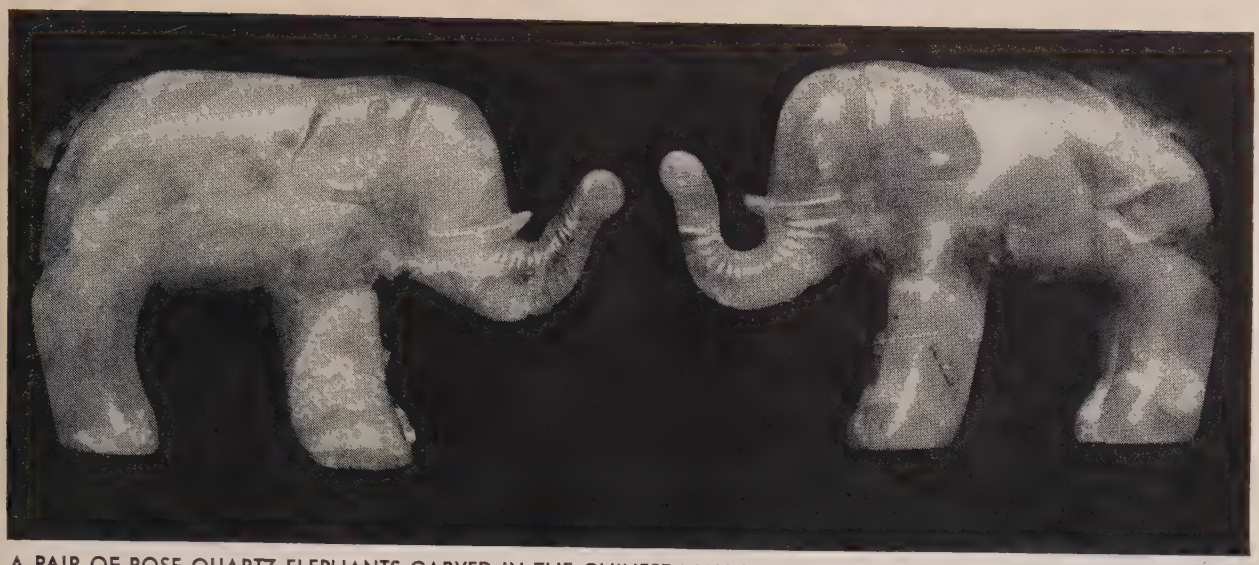
The art of carving and polishing rock crystal is perhaps most commonly associated with the Chinese and Japanese, who from ancient times have been noted for beautifully-worked vases, snuff bottles, ink boxes, incense burners and crystal-gazing balls. But the Russians, under the royal patronage of Empress Catherine, reached the highest perfection in the art and founded the industry of rock crystal engraving at Ekaterinburg in the nineteenth century. One of the finest examples of Russian workmanship is a seal showing Atlas holding the world upon which a map is engraved in accurate relief.

One of the most ancient uses of the rock crystal is the gazing ball. The Egyptians, Greeks, Romans, Chinese and many other people sought knowledge in the crystal ball. The fates of nations often depended upon what some seer saw in a crystal ball, and there is evidence that this belief in its powers is still a factor in international politics. Queen Elizabeth of England is said to have frequently consulted the famous crystal gazer, Dr. Dee, on personal and political problems. The Currahmore crystal ball, belonging to the Marquis of Waterford and said to have been given to him by one of the LePoers, who brought it from the Holy Land after having received the ball from the great crusader, Godefroy de Bouillon, is credited with the power of curing cattle of disease. The ball, a trifle larger than an orange, is placed in a stream of water and the cattle are walked up and down the stream to effect a cure. Crystal balls were found in the tomb of Childeric, father of Clovis, the tombs of French kings, and the Saxons of ancient England.

Religion has also made use of the rock crystal. An Aztec ruin gave up a human skull carved from rock crystal and probably used for religious purposes by those early inhabitants of Mexico. The luminous carbuncle on the shrine of St. Elizabeth at Marburg

MILKY QUARTZ CRYSTALS ON PYRITES

This photograph by Eddie Gregorka is of a specimen from Montana. All quartz crystals belong to the hexagonal system of minerals and have the same chemical compound of silicon dioxide, known by formula as SiO_2



A PAIR OF ROSE QUARTZ ELEPHANTS CARVED IN THE CHINESE MANNER

This is one of the many lovely specimens in the collection of the American Museum of Natural History in New York. This variety of quartz lends itself to such decorative purposes

was described by Creuzer as a brilliant rock crystal of a yellowish-white hue. In early times churchmen recited a special prayer to invoke images in the "mirror". A sixteenth century manuscript prescribes that "a crystal shall be laid on the altar on the side that the Gospel is read on".

The hokus-pokus of early medicine acknowledged the rock crystal. Its touch to the bodies of certain people was credited with a variety of astonishing effects. Even today the crystal is a supposed panacea for sore eyes, carbuncles, indigestion, sore throat, giddiness, blood poisoning and other ills.

The rock crystal has made its place in literature. Claudianus wrote that "ice hardened into stone which no frost could congeal nor dog-star dry up". Orpheus poetically called the rock crystal "translucent image of the eternal light", and he suggested its use as a burning glass to light the sacrificial flame. Sir John Mandeville described the palace of the Great Khan of Tartary as furnished with tables of gold, crystal and amethyst, over which was suspended a vine covered with fruit of crystal, beryl, topaz, emerald and other gems. He also described the palace in the city of Susa of the mythical personage, Prester John, as having windows of crystal. In Dyer's "Golden Fleece" the palace of Prim was paved with crystal garnished with diamonds, sapphires, emeralds and other precious gems.

Undiluted superstition has contributed to the history of the crystal. Some of the earliest charms supposed to guard against the evils and ills of life are small cylinders of quartz crystal that date from about 5000 to 400 B.C. They were cherished by the Assyrians, Babylonians, Persians, and Hittites. In the Middle Ages it was the belief that the rock crystal and poison could not exist together. Poisoning being then a popular practice, a cup made of rock crystal was supposed to crack, break or otherwise indicate that a deadly fluid had been poured into it. The Cherokee Indians used crystals as fetiches, believing them to have great power in giving aid in the hunt.

There are many other strange pages in the history of the rock crystal. It is worn by Chinese mandarins to distinguish rank. It is one of the three gems of winter. It is recognized as the gem stone of Belgium, Switzerland and

PHOTOGRAPH FROM WARD'S

ROCK CRYSTAL QUARTZ

This beautiful specimen comes from Arkansas. The rock crystal is the true trunk of the quartz family tree

Japan. It is synonymous with the feminine name of Constance and the masculine name of Christian.

Industry has made use of the rock crystal in the telephone, radio, television, optical instruments and other fields of manufacture. The citrine, smoky, the amethyst, as well as the rock crystal, are used for jewelry.

There are two quick and quite accurate identifications of the quartz crystal—it is a six-sided solid of a prism capped by pyramids at either end, and has a hardness of seven on Mohs' scale. The unaided eye can generally check the form, and a knife blade of good steel, which will not scratch, but will be scratched by, the crystal, will check the hardness. The actual finding of quartz crystals, whether they are free in the ground as a result of weathering out, or are in the matrix in which the crystal was formed, is a matter of persistence and alertness. What you find is often not only a surprise but a delight. So when next you see a quartz crystal remember it is important.

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An Alligator Infant

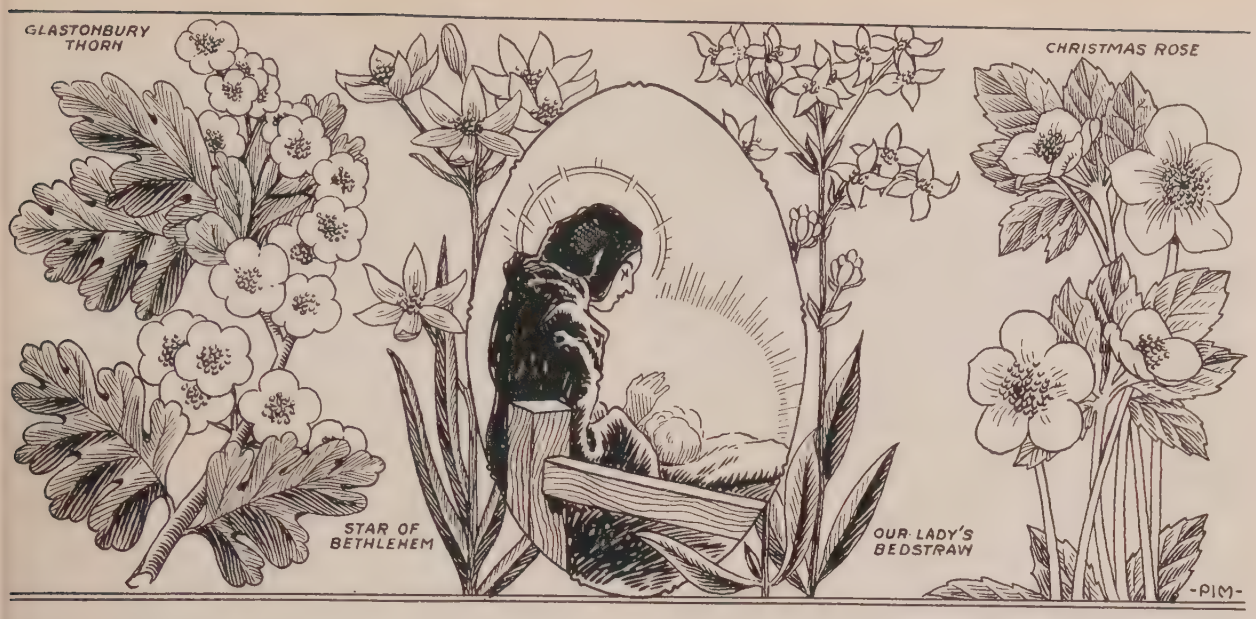
By HUGO H. SCHRODER

How large is a newly-hatched alligator baby? How does it compare in size with the egg from which it is hatched? These are questions frequently asked by folks who have not seen alligator eggs or newly-hatched youngsters. While many people have seen small young 'gators offered for sale in Florida curio shops in years past, few of them have actually seen the birth of a youngster, or seen the reptile's eggs.

When the alligator lays her eggs, she covers them up with plant material. The entire nest might be passed by as a sort of rubbish heap. While the eggs are in the nest, they become quite badly stained by the moist covering.

The little fellow in the photograph had been out of the egg only a little while. He was about eight inches in length; the egg at his side is more than three inches long. The egg at the top of the picture shows the chipping of the egg shell which usually precedes the emerging of the infant reptile. Beside the little fellow's right, front leg is the remains of the egg from which it hatched; all the shell covering had chipped away, leaving only the tough inside membrane. An idea of the width of the alligator egg may be gained by comparing the size of the youngster's head resting upon it.

Almost as soon as the infant reptile pokes his head out from the egg, he is ready to use his sharp little teeth to defend himself. He will snap at anything held near him.



Rich in history, romance and religious symbolism is—

The Plant Lore of Christmas

By PAUL PIM

BECAUSE of their connection with the birth or childhood of Christ many plants, trees and flowers are prominent in the folklore of Christmas time.

The rose-colored sainfoin is one of these, figuring in a pretty legend that comes to us from France. This plant was among the herbs and grasses that composed the bed of the Christ child when he was lying in the manger at Bethlehem. Suddenly, so the story goes, the plant came to life, opening its pretty blossoms to form a wreath around His head. This plant, *Onobrychis sativa,* is a low-growing perennial of the pea family. It is native throughout central Europe and has been cultivated for centuries for pasturage and hay.

Because of the resemblance of its flowers to the star that guided the Wise Men on that first Christmas 2000 years ago, a small, hardy plant of the lily family is called Star of Bethlehem, *Ornithogalum umbellatum.* On account of the late opening and closing of its flowers it is often called "Eleven O'clock Lady" or "Johnny-go-to-bed." *Ornithogalum* means "bird's milk," but the reason for its use is obscure. It is believed that bulbs of this plant were the "dove's dung" mentioned in the Bible as having been sold at a high price during the siege of Samaria. It has become a common roadside plant in America. The petal-like sepals are white, but have green stripes on the outside, a color scheme repeated in the leaves, which are green with white stripes.

Because of the belief held by some that the manger in which the infant Jesus lay was filled with a plant known technically as *Galium verum,* it is called popularly "Our Lady's Bedstraw." Above the "ruffs" of its lance-shaped leaves are clusters of little white cross-shaped flowers. If you gather a handful of the stems and put them in your pocket you will find, as they dry, that they give out the odor of new-mown hay. Country people used to pack the dried plant with linen, or use it as stuffing for beds. One Old World bedstraw, *Galium mollugo,* has become naturalized in America and is commonly known as baby's-breath.

Because "it flowereth at the birth of Christ" the Christmas rose, or black hellebore, *Helleborus niger,* is also called Christ's herb. Its flowers are first white, sometimes tinged with red, but later they turn green. It is called black hellebore because of its black rootstock, which is the source of a powerful poison. On account of its purgative and emetic qualities it is sometimes used in medicine. Ancient Greek doctors while cutting the Christmas rose used to curse loudly. This was supposed to increase the bitterness, and, consequently, the curative qualities of the plant. The white hellebore, whose roots are dried and ground to a powder for insecticide, is a plant belonging to the lily family.

An old legend says that the Rose of Jericho first blossomed at our Savior's birth, closed at the crucifixion and opened again at Easter. It is also called the Resurrection Plant. The curious Rose of Jericho grows in the desert regions about the Red Sea. It has the strange property of curving its branches into a ball about its seed-pods after the leaves fall, to be blown hither and thither by the wind in the manner of tumble-weeds. When moistened the

branches unfold and, for a time, it again assumes the appearance of a living plant. It belongs to that large family of useful plants that includes cabbage, Brussels sprouts, radish and cauliflower.

Cabbages remind one of an old Dutch legend about the man in the moon. According to this old story, he was placed there for stealing cabbages on Christmas Eve. Just as he had filled his basket with his loot, and was walking away, the neighbors caught him. They "wished him" up in the moon where you can see him today bearing the big basket of cabbages on his shoulder.

In Somerset, England, where the first Christian church is said to have been built, you still hear the legend of the famous Glastonbury thorn. According to the story, Joseph of Arimathea, who buried Christ after the crucifixion, came to England, bringing with him the holy grail or chalice used at the Last Supper. Landing at Glastonbury, he walked inland and sat down to rest at a spot known as Weary-all-hill. He thrust his dry hawthorn staff into the ground and it immediately sprouted and grew into a tree.

Botanists, however, being literal-minded fellows, say there is a variety of hawthorn that always blooms just at the Christmas season in England.

In the Gospel according to St. Matthew we read that, "there came wise men from the east" and that "they saw the young child with Mary his mother, and . . . they presented unto him gifts; gold, frankincense and myrrh." This is all we really know about the Wise Men, but popular legend has greatly filled out the New Testament story. Tradition makes them three rich and powerful monarchs who came out of the East in barbaric splendor and moved slowly across the desert bearing the first Christmas gifts. We are told that they appeared to the Christ Child on January 6, or what is known as Twelfth Night or Epiphany.

According to legend, the Three Kings were: Melchior, King of Arabia, sixty years old, who brought a basket of gold in the form of a shrine, as he came from a country where the land is ruddy with gold; Gaspar, King of Tarsus, often represented as a lad of twenty, who brought myrrh in a gold-mounted horn; and Balthasar, King of Ethiopia, forty years old, reputedly of the black race, who brought a jar of frankincense. Each of these gifts was considered as symbolic of what the Christ Child was to become—gold for a king; frankincense for a God; myrrh for the great physician. Gold was kept in kings' treasuries, frankincense was burned in divine worship, and myrrh was used in medicine and in embalming the dead.

Frankincense is gum-resin obtained from certain species of trees of the genus *Boswellia,* found in East Africa and Arabia. An incision having been made in the bark of the tree, a milky juice exudes and slowly hardens in tear-shaped, yellowish drops. These are gathered as olibanum, or the true frankincense. It was highly valued by the Egyptians and other ancient peoples for embalming, fumigation, and for incense. It is still the most important incense resin.

Myrrh is a fragrant gum-like substance that oozes from a species of shrub found in Arabia and East Africa. It is used in medicine, incense and perfumery.

The Sicilian children, according to Folkard, put pennyroyal in their cots on Christmas Eve, believing that at the exact hour when the infant Jesus was born this plant put forth its blossom.

Holly has been popular for decorations since the time of the Druids. It is regarded as the special tree of the fairies, but there is a superstition that it is unlucky to take holly into the house except at Christmas time. From the beginning of the Christmas era the thorns and blood-red berries of the holly have become incorporated into the Christmas decorations as symbols of the Passion of Christ.

Among the ancient Druids the mistletoe was regarded with the utmost veneration, although the reverence they paid it seems to have been restricted to the plant when found growing on the oak. When the sacred anniversary of the winter solstice arrived, the ancient Britons, accompanied by their priests, the Druids, went forth with great pomp and rejoicings to gather mistletoe. In addition to religious reverence for it, mistletoe was also believed to possess wonderful medicinal qualities.

When the oak on which the mistletoe grew was reached, the priests dressed in white and cut sprays of the pearl-berried parasite with golden sickles. Nothing so coarse as iron would do to cut the holy mistletoe. Then white bulls were sacrificed to complete the ceremony of the winter solstice; to propitiate "My Lord Sun." The mistletoe thus gathered was divided into small portions and distributed among the people, (Continued on page 577)

ALL PHOTOGRAPHS BY THE AUTHOR

THE SNOW-BOUND WOODLAND BUFFET IN MID-WINTER. JUNCOS TWINKLE ABOUT IN THE SNOW BELOW THE STATION, AND GLEAN CRUMBS THAT HAVE SPILLED FROM IT

There is more than just feeding the birds to the joy of providing—

An All-Winter Thanksgiving Basket

By LULU MAY ALER

WHEN, on Thanksgiving Day, 1932, a good friend of our winter birds clamped a tray to a couple of park trees and roofed it with cattails bound to a lattice, he built the foundation of a perennial community feast—now in its tenth winter of nourishing the spirits of men as well as the bodies of birds. That day my journal recorded, ". . . We put our suet on the proffered tray. Chickadees came at once, not daunted by eight onlookers. Nuthatch likewise. Everyone stopped and watched, amazed at little wild birds being so friendly and unafraid." Since then hundreds have stopped and watched, amazed.

Because of the regularity and the time of our visits, we two dawn hikers became the enviable cateresses of this woodland buffet. Within a week a chickadee ate from my hand! Have you, too, thrilled to that tiny clasp? So confiding! So benedictional! With such winsome little patrons, our table attracted viands from far and near. A doctor's wife slipped out with cracked corn, bread, or butter when her husband made calls in our neighborhood. A retired civil engineer heaped grain under nearby hemlocks, and registered each new visiting species in an open guest book. Scraps from lunch boxes and kitchens gave variety to the fare and evidenced the universality of our boarders' appeal.

In this article the author, who is president of the Minneapolis Audubon Society, gives a graphic picture of the pleasure to be derived from a winter bird feeding station. Indeed, this particular station has proved an inspiration to many in Minneapolis who have voluntarily brought varied foods to the larder, or who have sought advice on the best way in which they, too, could feed the birds. And we may recall, also, the benefits to be won from friendship with birds as described in that best-seller among bird books—*Wings at My Window* by Ada Clapham Govan. Take the advice given here by Miss Aler, and in the book by Mrs. Govan, and go and do likewise.

So popular was our first Thanksgiving basket—with both birds and humans—that its donor planned for a long future. The next fall a strange medley of resounding hammer strokes and airy *dee-dee-dee's* broke the glen's November stillness. The pounder's warning, "Get out of here if you want another tray!" brought only gurgles of delight from the wee imps poking about in his nail box. One even popped gleefully to the threatening hammer, then to the man's shoulder as eager chickadee

ALL WINTER LONG DOWNY WOODPECKER GIVES THANKS FOR THE SUET. BELOW, A ROBIN WHO HAS MISSED THE SOUTH-BOUND CARAVAN CHECKS IN FOR THE WINTER

THE FLASHING BLUE JAY GULPS THE OFFERINGS DOWN WHOLE, APPARENTLY UNCONCERNED WHETHER THEY BE SUET CHUNKS OR SUNFLOWER SEED OR OTHER DELICACY

eyes twinkled, "What do we do next?" They remembered him as a friend indeed, for had he not tided them through biting blizzards? And because they in turn had cheered him and others through that year's dire financial storms, they were now to have permanent facilities for this mutual helpfulness. No wonder camaraderie graced the building of the new station.

Its location, twenty feet nearer a spring-fed creek, open even at thirty below zero, gives better protection from prevailing winds and brings the food we supply closer to Nature's vital beverage. Tall four by fours support a broad, substantial roof over a tray suspended between them at more than a squirrel's jump from trees and ground, but not too high for photography. Metal guards around the posts keep the squirrels from reaching the tray by climbing. And most welcome to us shivering provisioners are wire baskets with lids that lift off and permit quick replenishment of ground or shredded suet. Especially important to our diners are the baskets' inner cylinders that force the food out where they can get it without endangering eyes against cold metal.

Widening circles of human interest have kept up with growing clientele. To housewives saving watermelon, cantaloupe, pumpkin, and squash seeds, and dealers contributing suet and grain, have been added in recent years the Park Board, a bird club, and a garden flower society—all helping generously. Many school classes are here initiated into the joys of bird friendship; ardent young faces and cautiously suppressed "Oh's" and "Ah's," as eight or ten species—diverse in dress, size, and manners—wing in for breakfast, attest the dramatic impression made on these potential conservationists. Although as a community project, our basket, Topsy-like, just "grow'd," it effectively pools resources and distributes blessings by and for folk of all ages and conditions.

Now more about the squirrels. If you know them at all, you have already guessed that to some, at least, guards were only a challenge. Day after day one hardy fellow experimented until finally, with a running jump, a light touch on the post at just the right spot, and a twisting swing, he caught the rim of the tray. Eventually all "his sisters and his cousins and his aunts" learned the trick. Then day after day we, too, experimented; encased the posts in smooth metal, surrounded them with thorny branches, tried everything anyone suggested, except funnels, which would have involved raising the tray impracticably high. The squirrels won. So, extending our service out on to the upper guards, we reconciled ourselves to keeping it so bountiful it could never fail less greedy guests. And we built the near-by observation blind we had long desired. It is also our pantry—and the squirrels' spring-board for the tray!

Regular all-winter boarders are squirrels, black-capped chickadees, white-breasted nuthatches, downy and hairy woodpeckers, blue jays, cardinals, ring-necked pheasants, and, in later years, house sparrows. One fall that startling, scarlet-crested giant, the pileated woodpecker, paid us elusive visits for a fortnight, only to vanish the day tree trimmers took crashing possession of the park. One Christmas, quaint, lovable bob-whites checked in for the rest of the winter. About this time, too, summer birds—robins or a crow—that have missed the last caravan south often join us. But a red-headed woodpecker subsist-

ing on acorns within sight of our table was seen visiting it only once; and a bronzed grackle, steady customer through December thirty-first, declined to register for the new year. Most surprising were two mallards, grateful refugees from our death-dealing Armistice Day blizzard.

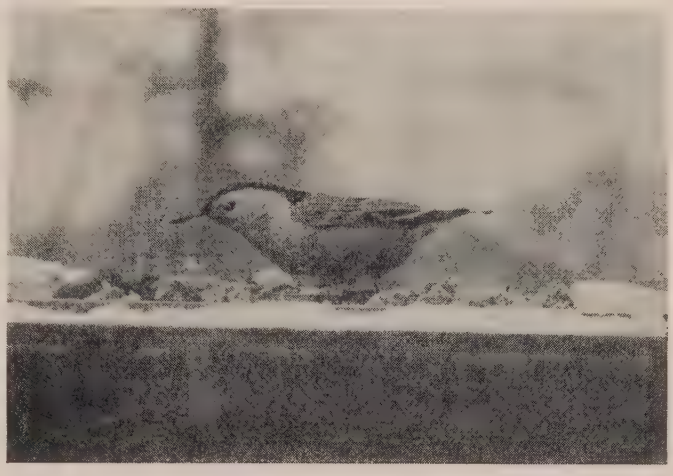
At the extremes of our season—October and April—lingering or early song sparrows and redwings sometimes feed with transient fox sparrows, white-throats, and hermit thrushes. A rusty blackbird once dropped from his southbound flock to whistle and sing for his meals until the spring return of his fellows. Always brown creepers and slate-colored juncos stop off, generally for all winter, while at times tree sparrows and redpolls from outskirting weed patches seek our tray. A rare, choice patron of our sunflower seeds is the unassuming, erratic, resplendent evening grosbeak.

To these known beneficiaries might doubtless be added other species whose watchful interest in our catering indicates probable snacks unobserved—goldfinches and purple finches through most winters; pine grosbeaks, golden-crowned kinglets, and pine siskins occasionally; a belated flicker, an eastern meadowlark, and Brewer's blackbirds. Once a Bohemian waxwing paused to watch us serve mountain ash berries. Perhaps he later indulged? What chance wanderers call unnoted between our brief once-a-day visits? You who have home trays under close observation have the advantage here.

You have a better opportunity, also, for intimate acquaintance with individual guests and their quirks. How many different chickadees snatch seeds rolling out of my can and how many downies nip suet while I spread the seed, I never know; nor how many juncos twinkle below in the snow gleaning spilled crumbs. Even our big, shy hairy woodpeckers, dashing back and forth past the counter, not quite daring to eat until I turn away, remain uncounted, undifferentiated. My birds' ability to single me out from dozens of passersby puts me to shame. When a hoarding nuthatch raises his upside-down head to say *"ank! ank!"* for the tenth haul of suet in ten minutes, I dare not suggest leaving some for others—for maybe he is a half dozen, instead of one!

But a wee-voiced brown creeper stamped his individuality on my mind—and my heart! And I had labeled him "stupid, routine-bound"! When we opened our station, the creepers at first wound on up our two trees ignoring the attached suet; then came passing nips, finally brief pauses. But not until the second fall did one deviate sufficiently from his inherited behavior pattern to wander over the tray picking up crumbs with the seed-eaters. Last year came the climax. Throughout a winter of deepest snow and the only one in which predation laid dread silences on our colony, one endearing little creeper never failed me. Often he rushed to meet me and frisked gaily alongside, repeating his cheery *shree-ree-ree-ree* as his light climbs on each tree paralleled my laborious plowing through drifts. Although never seen on the table, he liked to mouse around under it, cheeping comments about dropped tidbits—a most fascinating, companionable mite!

Another guest surprised me with novel behavior. A cardinal and his mate—pioneers whose regal family had only recently spread into Minnesota—had discovered our first basket, liked it, settled near it. People came from afar to see their first cardinal, and often caught the vivid spec-



WITH OUR SUNFLOWER SEED AND SUET THE NUTHATCH STOCKS HIS NEIGHBORHOOD LARDERS. BELOW, PEANUTS KINDLE THE EYES OF THE CHICKADEE MOST OF ALL

THE NUTHATCH IS A HOARDER AND NO MISTAKE, SEEMING TO BE OBSESSED WITH THE NEED FOR SETTING ASIDE FOR A RAINY DAY, OR FOR A FOODLESS TIME

tacle of this glowing redbird and a flashing blue jay dining together, as strikingly contrasted in manners as in color. With pride I praised our new friend's elegance—the quiet dignity with which he shelled each seed in his bill while the boorish jay noisily pounded his open on the tray or gulped them down whole. What a shock one day to find my paragon in a temper! He was leisurely extracting a sunflower kernel when an impertinent house sparrow plumped down in front of him, almost on his bill. Not merely did he bristle; he *hissed!* Involuntarily the sparrow fluttered up, but instantly dropped again, close to the cardinal's left cheek. Another hiss, another flutter, and the sparrow brushed his right cheek. Several more rounds—then the angrily protruded red beak hissed the vagrant out of the station. And I applauded!

He and his lovely lady fared so well with us that now their progeny adorn home stations throughout the neighborhood. One cardinal breakfasts daily with a couple I know—he at his tray of sunflower seed on a sheltered south window sill and they at their table just inside. Chickadees, nuthatches, and downies wait their turn for a share at his tray.

A tray, seed, suet—so simple are the properties for staging this window pageant. A rim on the sill's edge and an upright stick for anchoring the suet could obviate the tray. Should only an exposed window be available, a rectangular box, with front and back removed except for a narrow strip on the floor's outer edge, would shield birds and food without obstructing your view. If placing the box away from the house proves desirable, the back may be left on for added protection, and the supporting post may be cat-proofed with barbed wire, smooth metal, or an encircling inverted funnel. You can evolve endless variations of this simple feeder, or find in library books help in making the trolley type that gradually lures timid friends from a distant tree to your window, or to the glass-enclosed inset that brings them into your very room. Just remember it is the food they are interested in, more than the manner of serving.

Not only beef suet but other meat fats and scraps attract the insect-eaters—also many seed-eaters. Sunflower, squash, and other seeds; chickfeed, oatmeal, hemp, millet, and other grains; bread and cake crumbs; dog biscuit; nuts (especially peanuts and black walnuts), peanut butter; raisins, currants; and similar foods—all make a savory basket. A little grit and a regular supply of water should be provided when natural sources are snowbound or frozen.

More important than any particular menu is daily service. Once started it must carry on until spring, for in accepting our invitation, our trusting little guests lay their lives in our hands. Tiny bodies with temperatures far above ours cannot store enough fuel for a frigid search after new rations. I have seen sub-zero blasts chill even gay chickadees into huddled balls of fluff hopping stiffly, silently, slowly across our tray like mechanical toys almost run down.

You who have helped such valiant friends make their stand against winter's blitzkrieg at your board know how immeasurably more they give than they receive—what refreshing interest, cheer, and inspiration they constantly bring. Our inexhaustible Thanksgiving basket!

In Praise of a Dumb Animal

By ROSALIE REES

Although you may not like his shape,
Toby is a charming ape.
With Lebensraum he's not concerned;
Of Aryan myths he's never learned.
He drops no bombs. He drives no tanks.
He steals no gold from his neighbor's banks.
He loves his offspring—leaves them free
To sate their curiosity.
Alas, I must deplore, O Man;
You've not improved much on his clan.

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Nocturne on a Frozen Stream

By WILLIAM A. WEDGWORTH, JR.

It's a half-tone scene lighted by a haloed moon.
Around this undulating ring of subdued tints
Great smears of white span the cloud-blotched sky
Where the color-strained beams stream through the rifts.
The bridge, vague ghost of a rainbow,
Spans a winding stream of smoky quartz.
Along this silent lane rough snows
Make alternate streaks of white and gray.
The elms are fans of ink-black lace
Like trees in a Chinese print.
There are daubs of nests in the charcoaled oaks
That the crows gathered when the sun sustained
A motion that is life.
Now the brown and soggy leaves flap in the cold, raw winds
On the ragged silhouettes of the oaks against the sky.
An engine rends the stillness, wailing past upon the rails,
And from a distant bo's hut drifts a dog's incessant barking.
A vast and brushy ruined forum is defined
By massive, leaning columns reaching to the deep blue-gray of a variegated dome,
Where the stars sail from cloud to cloud
In the wild gales that shear and fray.

When the hour strikes—

Clarino Sings

By MAY EMERY HALL

DETAIL OF THE WOOD CARVING, "MAN AND NATURE"
This is in the lobby of the Time and Life Building, Rockefeller Plaza, in New York. The little thrush above the rider sends forth its song hourly throughout the day

WHEN Clarino, known also as Blue Solitaire, awoke that particular morning, he had no idea that a special performance was expected of him. Otherwise, he might have preened his beautiful Quaker-gray plumage with greater care. As it was, he simply began the day as usual with his customary song; joyous, full-throated. Was it because the long night was over and the welcome sunshine flooded the room where his cage was hung? Was it because he wished to greet his master in the only way he knew how? Or was it because—but why multiply reasons for the lilting refrain that sent a note of cheer and happiness throughout the house? The main thing is that he sang and not at all as if depressed by being a New Yorker instead of a resident of Mexico, where his fellow thrushes were doubtless at that very moment pouring out their melody in woods and fields.

As was his habit, then, Clarino merely sang. If any conjecture entered his small head, it must have centered about the unusual attention he was receiving. What was back of it all? Although his master was always kind and friendly, why did he hover so persistently in his vicinity? Why did he listen in such rapt attention to the song he had heard hundreds of times before? More curious still, why did he bring in a group of strangers and keep them listening, too?

The truth of the matter was that Clarino was preparing for his début. In musical parlance, he was being given an audition. But Clarino did not know it. Nor did he know that he had singing rivals—a Persian and an Indian cousin—and that a test was in progress that would decide which of the three would be slated for a peculiar honor. In other words, upon the quality of his own song this special day would Clarino's reputation as a sweet singer continue, as before, among his immediate circle of friends or extend to a wider audience beyond the home roof. All unconscious of what was at stake, Clarino kept on singing—and won out!

Unlike other musical stars in concert and operatic fields, Clarino was not required to appear in person on any stage. Mechanical progress in the great, complicated world outside, of which he knew nothing, made that unnecessary. The strange men were fixing up wires in his room, yes, but how was he, a small thrush, to know that these contraptions had the slightest connection with his song? Ah, but they had the closest connection! These engineers (for such they were) were from one of the country's largest broadcasting stations. So well did they do their work that today, and every day, if you happen to be in the lobby of the Time and Life Building on Rockefeller Plaza on the hour from eight o'clock in the morning until six in the evening, you will hear one of the most unique innovations ever introduced into an industrial center. For two whole minutes, while a carved, silver-leafed model of Clarino, operated by a hidden mechanism, opens his beak and flutters his wings, the real bird's recorded voice greets scores of passing clerks, stenographers, shoppers, students, radio employers and employees and sightseers. No artificial, mechanized trill is this, reminding one of the cuckoo-clock of former days, but the real thing.

During the brief hourly concert, Clarino's song is the outstanding attraction, of course, but it is by no means the

whole show. The attention of the passerby is likewise caught by a massive mural on the west wall of the lobby, flanked on either side by a smaller one. The central group is the largest piece of wood carving ever exhibited and the first piece of sculpture introducing sound and motion to be installed as a permanent decorative feature for the interior of any American building. It depicts a mounted woodsman against a forest background, suddenly arrested by a sound above his head, as are a nymph at the left and a faun at the right. Having reined in his horse, the rider discovers the cause of the silvery outburst—a small bird in the surrounding foliage. Clarino's double, in a word, doing his stuff!

The artist who achieved the striking masterpiece, "Man and Nature," is the distinguished Swedish sculptor, Carl Milles, whose studio is at the Cranbrook Academy of Sculpture in Bloomfield Hills, Michigan. His theme was inspired by Goethe's words: "Where song is, pause and listen; evil people have no song." The material used is North Michigan pine in its natural state, unpainted, unvarnished. Mr. Milles prefers to have it darken with age and thus acquire the mellow finish of ancient carvings such as are seen in Bavaria, the Tyrol, Switzerland and other parts of Europe. More than three years of careful, conscientious work were devoted to the "singing mural."

By comparison with the gigantic woodsman and his straining horse, the singing thrush is tiny, almost absurdly so, but his joyous, lilting solo, the sculpture says without words, is infinitely more precious than mere physical strength. This is shown by the very expression on the uplifted faces of the spectators. The worried business man is carried back to the fields and woods he knew in boyhood. The weary, discouraged office worker is reminded that beauty and hope continue to exist even in a world of competitive struggle where making both ends meet seems the main business of life. On dull, leaden days, especially, when a pouring rain or driving sleet outside reveal Nature in her somber moods does the thrush's song lift the hearer above his monotonous round of everyday duties.

At the unveiling of the mural, the speaker of the day said:

"With the shadows of war lengthening throughout the world and with increasing numbers of people forced to devote all their energies merely to exist, we in this country have a special responsibility to carry forward and foster the arts."

All of which is true. Even so, should not Clarino have the last word? Side by side with artistic inspiration and expression—the source of it, in fact—is what the thrush teaches. "Where song is, pause and listen. . . ."

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Saving the Turk's Cap

By EDWIN F. STEFFEK

THE Turk's cap lily, *Lilium superbum,* is, perhaps, the finest and most showy of our native lilies and should be preserved for future generations. In July and August it brightens the meadows and moist places along the edges of woods with its orange-yellow flowers reflexed like oriental turbans. Under favorable circumstances the plants have been known to reach a height of eight feet and to produce as many as forty blooms on a stalk.

This lily likes a reasonably good soil, not too dry, but well-drained, and a little shade or ground cover to keep the roots cool. The best time to plant it is in the fall, and the depth from six to eight inches.

Unfortunately, however, the numbers of this plant have been seriously depleted by dealers who prefer to collect the bulbs rather than propagate them themselves. This is really not fair since this lily propagates so readily. All that is needed is a little patience. Seeds that are planted in a light, friable soil as soon as ripe germinate the following spring, but, like those of many other lilies, form only a tiny bulb and fail to appear above ground the first year. The following season a tiny leaf appears and growth commences in earnest, reaching the flowering stage the third or fourth year from sowing.

Also, some of the scales may be removed from the bulb, which is large and rhizomatous. If planted about an inch, or an inch and a half, deep in the same kind of soil, they will produce strong plants within a few years.

"Revenoors" do not raid the woodland stills producing—

Oil from Birches

By F. E. HARDART

It was difficult to believe that there could be any relationship between the delicious wintergreen candy I was munching and the tall, graceful sweet birch trees sighing overhead. But the aromatic vapors escaping from the sealed vat before me proved it, for it was from the bark of this sweet birch that an oil was being distilled to take the place of wintergreen oil.

At the rustling of newly-fallen leaves behind me I turned to see Carson W. Butler and his faithful old horse dragging up more birch limbs for his home-made distillery before which I stood warming myself.

"About time to unload the vat," he observed, opening the sheet iron door and peering into the brick-lined firebox. The fire there had died to a few glowing butts of wood. "We change the run every day about three o'clock in the afternoon."

He bustled around the six-foot-square wooden boiler held together by bands of iron, loosening the clamps that held the lid in place. A hand hoist, suspended over the crude "still" from upright poles, lifted the heavy square into the air. "Whoosh," the remaining steam in the vat flung out at me, bringing with it the choking odor of hot rubber, for the rim of the boiler is lined with old inner tubes to seal it air-tight.

Unloading the vat is the most unpleasant and dangerous operation in distilling birch oil because the heat and fumes rising from the "still" are likely to overcome the strongest men. But with a few deft strokes of a rake, Mr. Butler hauled the boiled limbs and pieces of bark from the five-foot-deep still box. All this debris was laid carefully aside, well spread out, to be used for fuel when dry.

Mr. Butler allowed the small amount of water and distilled oil in the bottom of the copper-lined vat to remain. I helped him toss in limbs and twigs, which he had already cut into five-and-a-half-foot lengths and bound into bundles about the size of grain sheaves. When the vat was almost full of these, heavier limbs were laid on top to hold the lighter material down.

"It holds about twenty-two bushel of this stuff," Mr. Butler grunted, as he heaved in another armful of limbs.

Each equipped with a galvanized bucket, we added more water to the boiler until it was about fifteen inches above the bottom. Then I helped him swing the lid back into place. Soon a roaring fire was sending sparks flying from the top of the chimney and more birch oil was in the process of being distilled.

In a few minutes steam curled up from the water in the vat, carrying minute drops of the sticky, aromatic oil out of the bark. The only means for it to escape was through a six-inch outlet in one side. From this vent the vapor passed through a funnel into a copper worm running through a trough of cold water supplied by a spring high on the hill above the camp. The condensed steam and viscous globules of oil dripped slowly into a glass jar set in the middle of a large tub.

Since the oil is twenty per cent heavier than water, it quickly settles to the bottom of the jar while the water overflows into the tub. The "low wine," as the overflow of water with a small percentage of dissolved oil is called, is poured back into the vat the next time it is opened. By this reduction method from three and a half to four pounds of oil are collected a day.

This same process is going on in hundreds of other places in the United States, for Mr. Butler's home-made still, in northeastern Pennsylvania, is typical of the apparatus from which birch oil is obtained.

The oil is a heavy, glistening, brownish fluid with the pungent, aromatic

LOADING SIDE OF THE STILL

In the foreground are poles ready to be cut. Note the chopping block under the jug, which is half full of birch oil. This is one day's work, probably about four pounds. The three men in front work the still and the fourth is the visiting local horse doctor

odor of wintergreen. When first distilled it is clouded with impurities, but these are removed by filtering the oil through cotton cloth. It is then stored, and later marketed, in five gallon cans and brings $2.25 to $2.75 a pound.

Drug companies and confectionary makers constitute the largest buyers, for the oil is used in drugs, disinfectants, insect powders, candies, and chewing gum.

Before the present war broke out, a synthetic wintergreen oil was manufactured with salicylic acid as its base. However, the use of the constituents of the synthetic oil in producing goods essential to the defense of our country has increased its price to such an extent that birch oil is rapidly taking its place in the dislocated economy of the times.

AT THE STILL CAMP

The log cabin serves horse and man for shelter during severe weather. At the left is brush cut and tied to be placed in the bottom of the still with heavier wood at the top. Such stills seem primitive but are really quite sufficient in turning out the product

During the first World War, birch oil was distilled extensively, and toward the end of the War brought as high as $10 a pound. Present prices will, no doubt, also rise as synthetic wintergreen oil becomes more expensive to manufacture.

The "birch stills" of 1916-1918 were found mostly through the south, especially in North Carolina, where the mountaineers used the same stills in which they had formerly brewed "moonshine." Most of the sweet birch groves in that region were exhausted during those operations, but, no doubt, in these twenty-three intervening years the groves have been reforested with trees large enough again to make practical the distillation of oil from their bark.

The original cost of an average "still" is $100 and is usually operated by a family, or one man and a helper. A crew of at least two men is required in each camp, although three men can divide their time between two stills if they are not too far apart. Mr. Butler with his two brothers, Lyle and Paul, operate the camp I visited.

The workmen spend their time cutting and hauling the birch into camp, chopping limbs into proper lengths and binding them into bundles, tending fire, refilling the vat, and sawing up trunks and larger limbs for domestic firewood.

At present distilling birch oil is not highly profitable, for one "still" earns only a bare living for a small family or a couple during the months in which it is operated, usually September through March, and often April. The operators work elsewhere during the summer months.

Someone must be on watch every hour of the day and night when the "still" is operating to keep the fire burning brightly and to prevent sparks from the chimney from setting fire to the nearby forest. Forestry men frown on these operations because they are a constant fire menace, since a spark arrester is seldom used. However, few fires occur around "birch stills" because of the constant vigilance.

Whenever a fire does break out, the inaccessibility of these operations makes fighting it doubly difficult, for they are often located far from any habitation or highway and can be reached only by horse or sometimes by wagons along a rutted, bumpy road winding among the trees.

Sweet birch is found from Newfoundland to Iowa, and southward to Florida, but only in the New England States, Pennsylvania, and West Virginia, and possibly in the Carolinas, are found groves large enough to make "birch stills" practical.

The sweet birch, *Betula lenta,* or black birch, is also sometimes known as cherry birch because its smooth, reddish-brown bark and its leaves closely resemble those of our garden cherry trees. The narrow, conical heads of these birch trees often reach eighty feet into the air. In the early spring long, pollen- (Continued on page 578)

Although not the plant of Christmas, still very interesting is—

The Pigmy or Dwarf Mistletoe

By ETHEL HINCKLEY HAUSMAN

TRAVELLERS in regions of our country where evergreens abound no doubt have often noticed among the branches of spruces what seem to be great balls of twigs looking like huge birds' nests. From local residents one learns that they are variously known as "witch's brooms", "hexenbesen", or "birds' nests".

These clusters are caused by an interesting but little known parasitic plant, the pigmy or dwarf Mistletoe. It is always a matter of considerable surprise to most persons to learn that a true mistletoe grows thus so commonly among our northern spruces and larches. Like the well-known Christmas mistletoe, the dwarf mistletoe is a parasite, growing most commonly upon the black, and the white, or cat spruce of our northern states. It is known more for the effect it produces than for its own bulk, because it is a tiny thing, not more than half-an-inch or an inch in length, and hence often not much longer than the needles of the twig upon which it is growing.

A close examination of a twig composing a "witch's broom" will show that it is supporting a growth quite different from the needles with which the twig is normally clothed. This growth is composed of a multitude of strange-looking little individual plants, not much larger then the needles themselves, rather waxy and succulent in appearance and yellowish-brown, pinkish-brown, or chocolate-brown.

As the season advances, the plants bend outward toward the tips of the twigs on which they are growing, until the fruits ripen. At this time the matured capsules or seed pods hang outward and downward. Each capsule contains a single tiny seed. In late September or early October the capsule case is under such a tension that the slightest disturbance causes it to burst with sufficient dispersive force to hurl the seed outward, sometimes to the distance of thirty feet or more. As it flies through the air, each seed trails behind it a tail composed of several sticky threads, which not only guide the seed in its flight, but also serve to attach it firmly to whatever object it may happen to strike. Moreover the threads readily absorb moisture, which is essential for the germination of the seed. It is believed that birds actively aid in the distribution of the seeds (since dwarf mistletoes occur abundantly on islands several miles off shore), for the sticky seeds adhere to their legs and breast plumage as they hop about among the twigs of the trees.

PHOTOGRAPH BY E. H. HAUSMAN

LARGE "WITCH'S BROOM" IN WHITE SPRUCE

At least seven other smaller "brooms" may be seen lower down in the same tree

After a seed has found lodgement upon a twig, it germinates in the presence of moisture, sending downward beneath the bark a series of little rootlike structures (not true roots, but filaments known as haustoria), which spread about and secure for the plant, at the expense of the host tree, the nourishment upon which it grows. Both the haustoria and the tiny mistletoe plant grow forward, keeping pace with the growth of the twig. From this it will be seen that the dwarf mistletoe is a thoroughgoing parasite, lacking the green chlorophyll with which to manufacture its own food, and depending both for food and for support upon the host tree. If the plants become too numerous, they ultimately cause the death of their host.

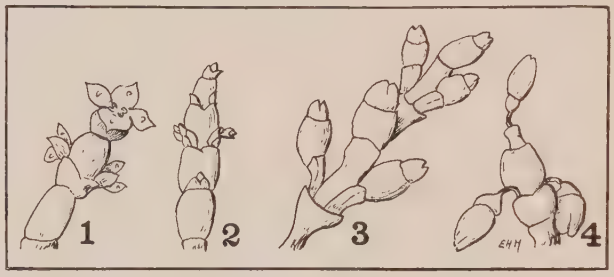
In late April and early May one may find the dwarf mistletoe plants in blossom, the male or staminate flowers, and the female or pistillate flowers appearing on separate plants, and usually on separate trees. The staminate flowers are the more showy by reason of their bright yellow anthers.

If one examines a spruce twig from an infested tree, one will notice that the end of the twig, that is, the newest, or this-year's growth, shows no sign of the parasite. Tiny buds of the mistletoe, however, begin to show, pushing through the bark on the second section of the twig

that is on last-year's growth. Full grown plants will be found on the third section, that is on year-before-last's growth; while flowering or fruiting plants will be seen on the fourth year's growth. The growth of five years back will usually show only the scars that have been left by plants that have fallen off. The dwarf mistletoe is therefore a biennial, attaining its vegetative growth in one year, and flowering and fruiting the second year, after which the plant dies and drops off. The branches attacked by the mistletoe plants are usually thicker than the normal branches of the tree, and are stimulated to grow more abundantly and more closely compacted in this region, thus forming great masses or "brooms", which not infrequently attain a diameter of several feet, and which may be visible at great distances on the horizon.

PORTION OF TWIG OF WHITE, OR CAT SPRUCE

This shows the growth of twenty or more plants of dwarf mistletoe in early fruit. Below, details of plants. (1) Male or staminate plant; (2) Female or pistillate plant, showing flowers; (3) tip of plant showing immature fruits; (4) tip of plant showing the mature fruit and developed seed pods.



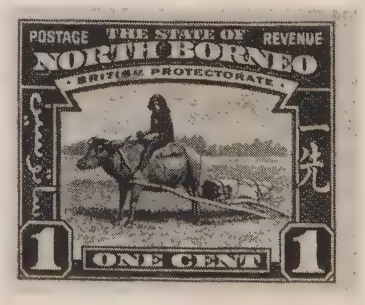
Sometimes the "brooms" take on attractive forms, as of small Christmas trees, or fans, or sprays, and one spectator at a ball in a city in southern Canada saw the women wearing in their hair sprays of spruce covered with the purplish fruits of the dwarf mistletoe. Did this bear the same significance as does the white-berried mistletoe of our Christmas celebrations?

The pigmy or dwarf mistletoe, *Arceuthobium pusillum,* is a member of the Family *Loranthaceae,* to which belongs also our familiar Christmas mistletoe, *Phoradendron flavescens.* It is widely distributed, being found from Newfoundland south to Pennsylvania along the ridges of the Appalachian Mountains, and westward into northern Michigan. About a dozen different species have been recorded from various parts of North America and the Old World, all having very much the same characteristics of growth and effect upon the trees they have chosen to be hosts.

The Water Buffalo

By EDITH M. LAING

In the marvellous economy of Nature man finds liberal provision for his needs, however often he has abused such provision. When need arose for special draft animals to cultivate the wet rice fields of southern Asia and Malaysia, for example, the water buffalo was found to qualify to perfection. Consequently, *Bos bubalus,* wild buffalo of India, the Philippines, and the Malay Archipelago has long been domesticated for farm and transport labor. The animals are also valuable as a source of milk and butter, meat and hides.



No one would suspect that the patient beast pictured on a stamp of North Borneo, so docile that children are employed as herders, is in its native state extremely dangerous. In fact, it is regarded as a match for the fiercest tiger. Even the domesticated ones are at times uncertain in temper. Hunters in India face them only from the back of an elephant, for it is said that no creature in existence is so determined to stamp out the life of its opponent, so care is wise.

Swamps and mud are their idea of paradise, for water in which to submerge is necessary to their well-being. Their color is a very dark gray, blending well with the mud in which they love to wallow. The backward curving horns may measure as much as twelve feet from point to point along the curve. Like our own cattle, they feed on grass and grain.

A species related to the Indian buffalo is the Cape buffalo of Africa. Animals bred from one or the other of both species have long been used in marshy regions of Italy, Egypt, Hungary and western Asia.

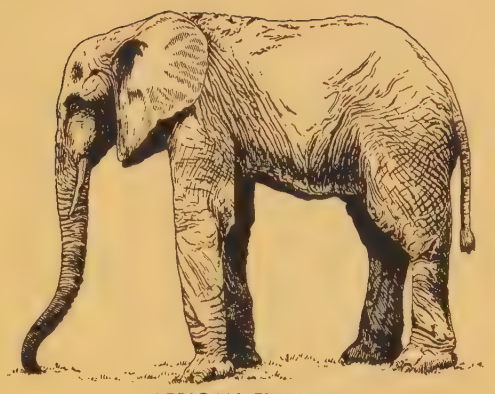
In parts of Borneo, when a wedding festival is held, a strange symbolic rite is performed. After the ceremony and presentation of gifts the guests assemble about a buffalo tethered outside. To the accompaniment of frenzied cries they slash at the terrified beast, and when it is overcome, smear their bodies with the blood. Nice people!

Circus and Zoo

The seventeenth in Nature Magazine's series of educational inserts

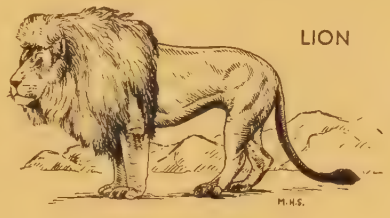
By E. LAURENCE PALMER

Illustrated by Hope Sawyer



AFRICAN ELEPHANT

WHEN the time comes that no little tingle comes around the heart at the sight of the year's first blatant poster announcing a circus is arriving; when the smell of the big-cat cages does not recall the mystery of closed wagons drawn by horses down dusty roads on a hot summer's morning long ago; when the first glimpse of the Big Top does not cause a slight quickening of the pace, and when you fail to be concerned about the weather early on circus day, then youth has fled and old age is on you. It is under the Big Top, or in the animal tent near by, that the real heart of the circus is found. There, you probably fed your first peanuts to an elephant. There, you first saw a real zebra or a moth-eaten camel. There you learned what was behind those gayly-painted fronts of the wagons in the parade. And there, you first gazed into the eyes of a lion and wondered how you would get along together if you were at his mercy in his home country as he was at yours in your home town.

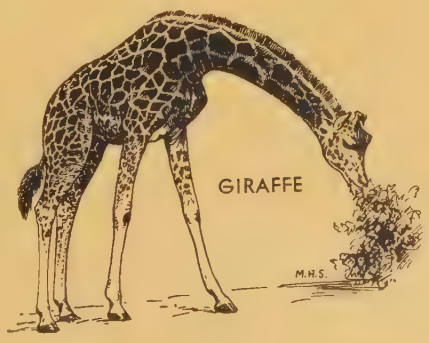


LION

Perhaps you wondered what the different animals eat, how old they are, if their feet ache, what they would do if they got out, and what you yourself would do under those circumstances. All this excitement and uncertainty only added to your appreciation of the opportunity to go to a circus, or to a zoo.

BACTRIAN CAMEL

Probably the greatest thrill of all would come if you were given the opportunity to go behind the scenes, to see what goes on in back of those flapping canvases, and even to go back home with the animals there, and see if their wild home would not be as strange to you as your home town must be to them.

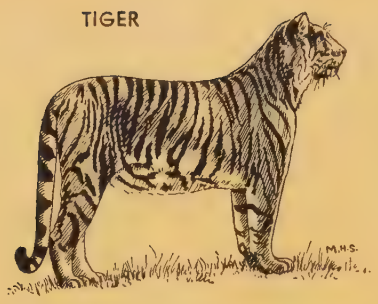


GIRAFFE

Most circuses advertise that they are "The Greatest Show on Earth", yet our modern circuses are the merest road shows compared with the early Roman circuses. But even those who chronicled the early Roman circuses could not agree on their size. Pliny tells us that the Circus Maximus accommodated 260,000 persons; then Aurelius Victor, not to be outdone, tells us that the same circus cared for 385,000 spectators. However, the early circuses differed from ours of today. They did not let you wonder what a lion would do to a man. They showed you. So there are advantages to our more modern arrangement, although, with our record of wars, it does not seem that consideration of humans for other humans has improved much.

While we kill millions with our wars and our cars these days, circuses are comparatively safe places for tame people and for wild animals. Many a lion lives its entire life without once having the chance to sink its teeth into a living potential supper. The job of keeping that lion and other wild animals in perfect health through their life span is not simple. It calls for the combined efforts of dieticians, veterinarians, sanitary engineers, psychologists, air conditioners, sympathetic caretakers, and even of good business men, who make possible the employment of the necessary talents.

When we visit a circus or a zoo, we are impressed with the endless pacing of some of the caged animals. By this the animal gets its exercise and keeps generally fit. An overfed animal would soon be useless as an exhibit for more reasons than one. Many animals that go "on the road" are given a part of the year when they can get fit under less trying circumstances. If a caged animal has a defective tooth, it gets care. If it gets bruised or torn in a fight, its wounds are dressed. There is almost no chance that the caged animal will ever go hungry long, and if its fur gets loaded with pests these are removed by its captors. If it is sufficiently valuable, the animal may be carted about in an air-conditioned cage and never be either uncomfortably hot or distressingly cold. In exchange for these "blessings", of course, the animal never has much privacy. Its mates,


TIGER

if any, are chosen for it. It cannot go where and when it pleases. And if it has imagination it has no future. Probably none of us, if given the choice, would prefer the security of captivity for the limitations of freedom. As John Branner quotes the ex-slave in his "How and Why Stories," "Atter all, honey, dere's de feelin's." And since, certainly, these captives for whose care we have accepted responsibility do have "feelin's," it is only fair that we give them what liberties we can. This is what we seem to be doing in our more modern zoos and circuses.

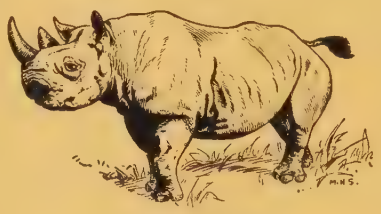
If you enter a modern American zoo you may be surprised to look off across open fields and see a number of lions apparently unconfined. Between you and them, also without any obvious cages, are birds and mammals that the lions might very well enjoy for a meal, and yet they do not. The reason is that the animals are kept from each other—and from you—by a series of deep trenches over which they cannot leap and out of which they cannot climb, even though they can and do fall into them. One lion, in the first few weeks of this sort of freedom, seemed to enjoy pushing his companions into the trench.

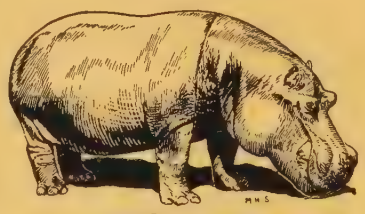
Probably the visitors to a zoo or circus provide more annoyance to the captive creatures than anything else. They like to pitch pennies or cuds of tobacco or candy wrappings at a sleeping beast just to see what he will do. Sometimes this is done in a kindly spirit. More often it is not.

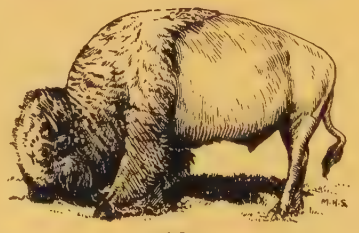
A few years ago, in a western zoo, some boys were tossing peanuts to some captive bears. When the supply was exhausted, one boy noticed that some nuts had fallen close to the inner bars but where they could not be reached by the bear. He climbed into the protective pit and in so doing got within reach of the bear's claws. Before he was released, he was terribly clawed. Experiences such as this make those who care for captive wild animals have a bad opinion of the consideration and judgment of the average visitor. Food that it should not eat may be tossed to a hungry animal. Cigaret butts may be flipped into piles of inflammable straw and cause burns, and food may be tossed to where it is just beyond reach, causing undue distress on the part of a hungry animal. Most wild animals in cages can do little about this except glare or growl, but man's nearest relatives, the apes, seem to have learned the lesson. Some do not remain on the receiving end of such a bargain but throw anything, including their own wastes, at the visitors outside. One can hardly blame them for these acts. It might be rather appropriate, particularly if they learned how to hit the right parties.

ZEBRA

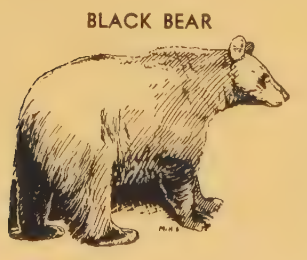
It is rather important to notice what animals do when they are freed from their bonds, if we are to judge their desire for real freedom and their intelligence. For the most part, animals finding themselves suddenly free "lose their heads" and dash wildly in any direction. After a short period of freedom, many of them welcome the opportunity to get back to the protection their cages formerly afforded them. Few show any uncanny skill in avoiding capture, and some do not resent recapture, particularly by attendants whom they have come to trust and to like. Of course, the offer of a suitable meal and the opportunity to hide in a familiar cage is often welcomed gladly by an animal suddenly driven to despair by strange people in strange places. Possibly, it is a sign of intelligence that they trade their freedom for a qualified security.


RHINOCEROS


HIPPOPOTAMUS


BISON

The kind of animals found in captivity is often limited by the kind of food they can be accustomed to accept. The grazing animals, which are not particular, are more common than the plant-eating sloths, which normally confine their feeding to a few kinds of plants that do not thrive in temperate regions. Meat-eaters usually will do as well on the flesh of old domestic animals as that of the animals upon which they naturally prey. But such creatures as ant-eaters are to be found in few zoos and fewer circuses because of their peculiar food needs. They may be fed a mixture of eggs, meat and other substances, but it is too much trouble to prepare these meals when equally interesting species that will eat hay or raw meat are available.


BLACK BEAR

The relative numbers of kinds of things found are also dependent upon the food they demand and what they can give in return for it. Camels and elephants eat much the same food, but elephants

POLAR BEAR

can do triple duty as circus performers, as menagerie wonders, and in hauling trucks and wagons out of the mud. Therefore, there are more elephants than camels in the usual circus population.

Wise circus and zoo managers frequently plan the feeding time of their charges so that the animals will be inclined to display themselves most when there are the greatest number of visitors around. People do not pay repeatedly to gaze at a cage in which an animal is sleeping off his last meal under a pile of hay. If, however, the meal is so scheduled that the animal will be up and about and seeking it when many visitors are around, then the visitors will get more satisfaction and the show more desired publicity of the right kind.

Young animals are almost invariably popular, whether they are of wild or of domestic species. The instinct of parental care is such, however, that some wild creatures will kill their young if they are too much annoyed at certain times. For this reason, breeding animals are more likely to be together in the zoos than road-show circuses. It is always an event worthy of mention in the newspapers, and stimulating to attendance, to announce that the hippopotamus at the zoo has given birth to a little hippo. Such an event, however, means added worries to the attendants, and new responsibilities for everyone. After the young have become semi-independent, and when they are still in the cute and playful stage, they prove very popular.

DEER

GIANT PANDA

COUGAR

OCELOT

LEOPARD

The details regarding the number of young of different zoo and circus animals, the nature of their food, the period of time between mating and birth, and some notes on longevity, are to be found in the chart section and need not be repeated here. It should be worth while, however, to notice the differences that exist between the reproductive behavior of such animals as the kangaroo, the camel, the lion and the elephant. Further details may be found in the charts published as the seventh of this series (December, 1939). There we had data on the Indian elephant, the camel, the llama and some of the monkeys. In this set are included pictures and data on the African elephant and the Bactrian camel to supplement those in the earlier set. It is probable that at some later date other animals of the zoos and circuses will be included.

The geography of zoo and circus animals is always interesting. Polar bears from the polar regions meet kangaroos from Australia, elephants and lions from Africa, and tigers and monkeys from Asia. Species from the mountains and from the sea are to be found in the zoos, and hippopotamuses from fresh-water streams may gaze across a few feet of space to another tank where sea lions disport themselves. Animals of the tree-tops and a few of the burrowers are in cages adjacent to those whose activities are limited to the surface of the ground.

STELLER'S SEA LION

GREAT GRAY KANGAROO

Our newer zoos are getting away from the habit of housing all of the cats together and all the bears together. There is a general move to bring together the animals that would naturally be together in Africa or South America or Asia or even in America. Other natural groupings are showing us the aquatic animals together, the plains animals, the woodland animals, and so on. It would seem that if the zoos and circuses wish us truly to appreciate how their wards fit into a foreign land, this newer tendency is distinctly for the better. We cannot get much idea of Africa if, without any help, we have to pick the African animals one at a time from a great many different groupings.

This idea of bringing natural associates together is being carried to the extreme of growing appropriate plants in the enclosures with the different animals, so that you see a monkey from India swinging from the top of a kind of tree that grows in India. Of course, the monkey would not know the difference, and probably would have no preference, but the impression we would have of the monkey would be more truly representative and this is to be desired.

Some animals seem to adjust themselves to conditions a long way from their home, while others do not seem to thrive when only a short distance from their natural range. The zoo in New York City has grazing animals from Africa, Asia, Australia and South America, but it does not seem to be able to get moose to thrive only a few miles from where they were once found wild. Even the native pronghorn antelopes of our western plains do not adjust themselves to life in the big city as well as do relatives living in similar terrain in the more remote continents. It is difficult to explain why these things are so.

For years, the zoos and circuses "played up" the bizarre and unique animals of foreign lands, forgetting that many of their patrons had never seen the common animals of the open country near by. Cows, sheep, pigs, goats and horses have been added to the zoos of some of our larger cities for the benefit of children (Continued on page 564)

COMMON NAME SCIENTIFIC NAME ORDER FAMILY	AFRICAN ELEPHANT *Loxodonta africana* Order Proboscidea Family Elephantidae	RHINOCEROS *Rhinoceros bicornis* Order Perissodactyla Rhinoceroses Family Rhinocerotidae. Rhinos, Tapirs, Horses	ZEBRA *Equus chapmani* Order Perissodactyla. Odd-toed Ungulates. Family Equidae. Horses	HIPPOPOTAMUS *Hippopotamus amphibius* Order Artiodactyla. Even-toed Ungulates. Family Hippopotomidae. Hippopotamuses
DESCRIPTION	Length, 10 to 12 feet. Height to 11½. Weight of male to a maximum, as reported, of 14,641 pounds. Skin, about 1 inch thick, nearly black. Ears, to 5 feet long and 4 feet wide. Eyes small, well protected with lids. Forefeet, with nails on 4 toes usually. Hind feet, with nails on 3 toes. Trunk, wrinkled, an elongation of upper lip, sometimes 7 feet long. Male, larger than female.	Indian rhinoceros, R. *unicornis* (not pictured), largest of 3 Asiatic species, has but one horn, measures 10½ feet from nose tip to tail base, and stands 5½ feet at shoulder. African rhinoceros (figured) stands 4½ feet and 8½ feet in length. It makes a track 9½ inches across. Its front horn is the larger and may be 3 feet long.	The wild, mountain zebra stands about 4 feet tall at the withers. Its general color is white, with black stripes on head, body, neck and legs. The Burchell's zebra stands 4½ feet high and has usually white legs with the body and head stripes black or brown over sorrel. The quagga stands 4½ feet high and has stripeless haunches and legs.	Length, nose-tip to tail-tip, 14 to 17 feet. Girth, about same. Male, larger and darker than female. Mouth, up to 2 feet wide, with large tusks. Eyes, set high and far back, just in front of ears, which are 3 to 4 inches long. Nostrils, at top of blunt nose, and large. Shoulder height, to 5 feet.
RANGE	South of the Sahara Desert through the wilder parts of central Africa and formerly south to the Cape of Good Hope. Range at present much restricted. The ancestors of elephants date back through the Eocene, *Moeritherium;* the Oligocene, *Paleomastodon;* the Miocene, *Trilophodon,* and the Pliocene, *Mastodon.*	Indian rhinoceros, native of Asia; Java rhinoceros, one-horned, of Java; Sumatra rhinoceros (small), 2-horned, of Sumatra, Thailand, Malay Peninsula; African rhinoceros, 2 - horned, from Abyssinia to the Cape in Africa. In 1731, a hair-covered frozen rhinoceros was found in Siberia.	Mountain zebras originally ranged through mountains of Cape Colony of Africa. The Burchell's zebra, *E. burchellii,* is native of the great plains of southern Africa and the quagga, *E. quagga,* probably has recently become extinct. Chapman's zebra, *E. chapman,* ranges over central Africa.	Never far from water, most of the time being spent in rivers, shallow mud-bottomed lakes, and lagoons; formerly from Egypt to Cape of Good Hope but now restricted to river area south of 17th parallel of north latitude. The related and smaller Pygmy Hippopotamus is restricted to the West Coast.
LIFE HISTORY	Sociable, living in herds. Gestation period, 18 to 22 months. Weight of calf about 200 pounds. Calf suckled 2 years. Limited room permits use of only one complete molar at a time in each jaw. The first milk molar of three shows 2nd week after birth. The 3rd is shed at 9. First true molar, 4th grinder, appears at 6, shed 20 to 25; 2nd appears at 20, shed at 60; 3rd and last, appears at 40 to 50. The tusks are incisors. Ordinary span of life about 70 years.	Not sociable. Young, born 19 months after mating takes place, always one. At the 7th year, the first horn appears in the Sumatran species. The young rhinoceros remains with the mother for some time. The life span, judging from zoo records, is about 25 years, though this must vary in the wild. Few enemies dare face it.	Reproduction is probably much like that of the donkey and the horse. (See two preceding pages.) The Burchell's zebra foal is born between 11 months and 6 days and 11 months and 20 days after mating takes place. The usual life span of a zebra is around 20 years, though few probably survive that time in the wild. Herd together for life.	Young, 1, born 234 to 243 days after the breeding; walks 5 minutes after birth, 18 inches high, 3 feet long, weight 60 pounds, gray and wrinkled; at 9 months eats solid food; at 18 months, male weighs 600 pounds, female, 650 pounds. First young born when female is 7½ years old. Life span, about 35 years.
FOOD HABITS AND ENEMIES	Food; exclusively plant materials, 100 animals requiring approximately 40 tons of fodder a day. African elephants enjoy the sun; may sleep either standing or lying down; when travelling, may make 15 miles an hour by sure-footed rolling gait. They have many parasitic enemies. Man is the worst large enemy.	Food; plant material, commonly twigs and shoots of mimosas and similar woody plants. The sense of sight is poor, but those of hearing and smell are excellent. The charge of an angry rhinoceros is direct, powerful and dangerous. Enjoys mud wallows as insect protection.	The zebra is a grazer like its horse relatives. In nature, it is the favored prey of lions but a group can defend themselves well against lions with their heels, with which they are expert. The call of a zebra is a peculiar neigh, something like a donkey bray but more pleasant. The animals feed in herds in the wild.	Food; many sorts of succulent water plants, but also eats such crops as corn, sugar cane and millet. In zoos, eats mixture of rolled oats, bran, cabbage, potatoes, lettuce, bread and hay. Can remain submerged not over 5 minutes. Apparently enjoy each other's company as they appear in large herds where undisturbed.
RELATIONS TO MAN	African elephants do not yield to domestication as do the Indian species. They are hunted by natives for flesh and hide, but more for the ivory of the tusks. African elephants can do much damage to crops and generally do this at night. They should not be completely exterminated, however.	Superior game animal but should not be completely exterminated. Natives eat the flesh of some species, value the dried blood at a dollar a pound, consider the skin a delicacy, and consider the horn worth $10 as an infallible, magic, love stimulant. Horn is really not bone.	Zebras are prized as food by native Africans who enjoy the yellow fat. They use the hides for clothing, shelter and implements and sometimes are able to break a few animals to harness if they can be caught young or reared in captivity. They are sometimes used with teams of mules.	May do considerable damage to crops. Flesh is edible and is used as food by natives. Hide makes an excellent leather. The skin of calf makes excellent soup, much like turtle soup. One animal may yield 200 pounds of fat, prized by Arabs. Teeth make excellent ivory. Is probably the *behemoth* of the Old Testament.

GIRAFFE *Giraffa camelopardalis* Order Artiodactyla Even-toed Ungulates Family Giraffidae, Giraffes	BACTRIAN CAMEL *Camelus bactrianus* Order Artiodactyla Family Camelidae	WHITE-TAILED DEER *Odocoileus virginianus* Order Artiodactyla Family Cervidae	BISON. BUFFALO *Bison bison* Order Artiodactyla Family Bovidae	GREAT GRAY KANGAROO *Macropus giganteus* Order Marsupialia Kangaroos and Opossums Family Macropodidae
Height, to 19 feet. Head, with short, blunt, straight, horn-like structures. Female, slightly smaller, more slender. Stiff mane, on back of long neck. Feet, large, heavy, with divided hoofs. Yellowish or whitish, with large, more or less square, black spots on body, neck, head and upper parts of legs. Female, duller than male.	Shorter legged and therefore not so tall as the Arabian camel, but with a heavier body and two humps on the back instead of one. It has a heavier coat of hair, harder and shorter feet permitting it to travel over rougher country more easily though it is easier but slower and therefore a poorer riding animal and more docile.	Length, to 8 feet. Tail, 11 inches. Height at shoulder, to 4 feet. Weight, to 400 pounds. Reddish chestnut or gray above with white below. Bucks, with forward pointing antlers but the prongs upward pointing. Antlers shed each year. Shy, except where protected. Marvelous jumpers and runners. Does, smaller. Fawns, spotted.	Length, to 11 feet; tail, 1½ feet. Height, 5 feet, 8 inches. Weight, to one ton. Color, dark brown but lighter on the rear portions. Hair over shoulders, forelegs and head, long and shaggy. Shoulders, high arched and powerful. Ears, small. Eyes, small. Horns, short, sharp, curving upward, unbranched.	Largest kangaroo; male, 5 feet from nose-tip to tail-base; tall, 3 feet long. Weight, to 200 pounds. Female, about ⅔ size of male and with conspicuous brood pouch. Fur, soft, gray-brown above and white below, with that on toes and tip of tail, black. Some kangaroo species no larger than rats.
Formerly, over greater part of Africa; now, found only in regions south of the Sahara, in central and south Africa. The areas where they live are waterless at certain times of the year. Has been bred successfully in captivity, in zoos, but needs greater areas where it may be protected.	Probably no wild Bactrian camels exist except individuals escaped from domestication. Now confined to the deserts of central Asia, although a native of the steppes of eastern Asia. It is to the wandering Mongolian tribes of the Gobi desert what the Arabian camel is to the Arabs. Never needs shelter in the bitterest weather or the hardest travelling.	Through North America south from the Gulf of St. Lawrence and James Bay, west to the Rockies; including closely related species, the range is extended northwest to the mouth of the Columbia River in Oregon. Thrives around clearings, in mixed woodlands, with water near by and plenty of food. Individual range rarely over 1 square mile.	Formerly, occupied territory between Appalachians and the Rockies, south to the Gulf of Mexico and north through the plains of Canada, with a related species, the wood buffalo, occupying territory to the north. It is now practically restricted to ranches and sanctuaries though the northern form lives over a considerable area.	This species in open fields commonly near water through large part of Australia and much of Tasmania. Other species live in mountainous districts and some even live in trees. Smaller species, called wallabies. Also in the Order Marsupialia are the koala (teddy bear), and wombat of Australia, and in our hemisphere the opossums and a shrew-like animal (*Caenolestes*), of the Andes.
Bull maintains a herd of cows. One young, born 15 months after mating; in 3 days, can trot beside the mother; March-April; is gentle and affectionate if caught and can be induced to eat. Normally, the captured calf refuses to eat and dies shortly. The life span, apparently, about 25 years.	Life history essentially that of the Arabian camel. This species can begin to earn its own living by work at the age of 4, and can continue a life of usefulness until it is 25, 30 or even more years old which is probably longer than is possible with the Arabian camel.	One male forms a herd with 2 or 3 females, fighting rival bucks; mates, November; 1 to 4 fawns born 6½ to 7 months later (June); each weighs, at birth, about 3¾ pounds. Young hidden, and nursed every 4 hours; by 4 or 5 weeks, follow mother; weaned and lose spotted coat at 4 months. Does follow mother 2 years; bucks, one.	Possibly monogamous though bulls fight each other. One calf, born 9½ months after the August-September mating, birth lasting less than an hour; calf stands in 3 to 4 days. Bull helps in protection. Calf with cow to 3 years, when young cow breeds; they may bear calf a year for 30 years.	One, 1 oz. young born month after the mating; makes way in ½ hour to brood pouch, there attaches to teat; develops several months. Young, "joeys", ride in mother's pouch until well developed, frolic with others during hot part of day while mothers rest. Except at mating time, adults are peaceful to all. Life span, 15 years.
Food: leaves of such plants as the acacias and mimosas. To graze on the ground, the animal must spread its forelegs far apart. It drinks little if any water. Its gait is a unique trot and a gallop with neck bent forward and tail raised over back. It can almost outrun a fast horse, if it has a good start. Voiceless. Sleeps standing.	Food: any plant material available; even bitter, salt-marsh plants which are rejected by other animals. When forced by hunger, it will even eat fish, flesh, bones and skins, and will drink either salt or brackish water. Is able to uncover plants under the snow and get them for food in winter. Can go 8 days without water in winter.	Food: largely browse, such as twigs and leaves of trees; not common grass. Will eat rye grasses, prefers weeds to timothy or blue grass and particularly enjoys nuts, yellow waterlily and acorns. Known to eat fish. In winter, forms "yard" of a herd in snow keeping snow trampled but often starving. Can run 22 miles per hour.	Food: grasses and other ground forage, the herds in the past moving north and south with the seasons to get the best pasturage. Small herds are family herds led by an old cow. Enjoys mud wallows as freedom from insect pests. Herds may be stampeded wildly in a given direction to their destruction.	Food: purely vegetable matter browsed from ground as do cattle or taken to mouth with forefeet. When excited, straightens up, leaps 9 to 10 yards at a bound, using tail as balance but *not* as spring board. Commonly found in herds of 30 to 50. Cornered, may kill large dog with blow from hind feet or hold under water until drowned.
It is valuable to desert people for hide and food. The flesh is eaten raw. The tendons are used for sewing leather and for strings for musical instruments. The Giraffe is shown on ancient Egyptian monuments; Julius Caesar is reported to have been the first to exhibit one in Rome.	Probably the most useful beast of burden in colder northern deserts, carrying daily loads of 500 to 600 pounds of coal, oil or other goods over the roughest of territory. It also yields hair, hide, flesh and milk of direct use to man. Both species are figured in the earlier Assyrian sculptures. Long used in war, even to present.	A most valuable game animal, providing sport, flesh, hide and trophies of high grade. In Texas, farmers get around $50 for deer harvested on their farms, but in most states sportsmen have managed to prevent similar provisions, with result that the sportsmen get deer probably and the farmers get nothing but injured crops.	The vanishing of the buffalo herds is a disgrace to American intelligence, but the fact that they have been saved from complete extinction is a credit to a few far-seeing scientists. Bison provided the Indians and early settlers with hair, hide, flesh, fuel, bones, and sport, all on the hoof and easily obtainable.	Hunted for leather, which is water-proof, for flesh, and for sport. Leather makes excellent shoes. Hunting so uncontrolled that larger species almost exterminated. 500,000 killed, 1877-1902. Their natural foes, dingoes, took to killing sheep. Dogs bred from mastiff and greyhound are used in hunting. Seen in circuses.

COMMON NAME SCIENTIFIC NAME ORDER FAMILY	LION *Felis leo* Order Carnivora Family Felidae	BENGAL TIGER *Felis tigris* Order Carnivora Family Felidae	LEOPARD *Felis pardus* Order Carnivora Family Felidae	COUGAR *Felis couguar* Order Carnivora Family Felidae
DESCRIPTION	Length, male, to 7 feet, plus 3-foot tail. Height at shoulder, 3 feet. Weight, to 583 pounds. Female, usually a foot shorter and more slender than male and lacks conspicuous mane of adult male. Color yellow brown without stripes and only slightly lighter beneath. Mane, almost black, in older animals; lighter, in young.	Length, 6½ feet, plus 3-foot tail or larger. Weight, 500 pounds or more. Female, slightly smaller; with lighter and narrower head. Old male has long hair on cheeks but no mane. Hair, relatively short and smooth. Fawn-colored or reddish, with white underparts and with many black transverse stripes. Highly variable.	Length, male: body, 57 inches; tail, 38 inches. Female and average, smaller; some as short as 5 feet total. Tawny yellow above and whitish below, with numerous rosettes or dark or black circular spots resembling animal's foot print over body, these being smaller on the head. Tail, sometimes ringed.	Length, to 9 feet; tail, 3 feet. Weight, to 200 pounds. Uniformly yellow brown, but darker above; lighter beneath. Like a large, slender, small-headed cat. Fur, relatively short, close and uniform. Whiskers, rather prominent. Toes, retractile. Tracks, 4 by 4 inches, with 18 inch stride, 4-toed.
RANGE	Throughout Africa, from the Cape to Algeria and Abyssinia; and in Asia, from Mesopotamia and southern Iran to the northwest part of India. Formerly roamed Syria, Arabia, southeastern Europe and in prehistoric times through Germany, France, Spain and the British Isles. Now restricted for practical purposes to Africa for most part.	Essentially of jungles; found only in Asia and particularly in India and from northern China to Malay Peninsula. Unknown in Ceylon, Philippines and Malay Archipelago, but common in Java and Sumatra. In warmer climate larger and more brilliantly colored than in cold climate, also more powerful.	In Africa, from Cape Colony to Algeria; in Asia, from India, Burma, Thailand, Ceylon and Malay Islands west to Syria. Formerly, through Europe to Spain and Great Britain. Black leopards or "panthers," with deeper ground color, are found only in Asia. African leopards have smaller, more solid spots.	North and South America. In forested areas for most part, but also in rocky canyons and even semi-desert lands. From coast to coast, Quebec to Vancouver Island and south to Patagonia, including a number of varieties. The eastern form ranged from southern Canada to the Gulf of Mexico but is now greatly restricted.
LIFE HISTORY	Pairs for life; not promiscuous. Young, 2 to 4, born about 16 weeks after mating. Young born with eyes open; helpless for several weeks; about size of large cat; frizzled fur. Young female suffers at teething time and may die; weaned at 3 months. Mane appears at 3 years and best at 8 years. May live to 19 years. Nocturnal.	Adults pair; breed alternate years. Young, 2 to 4, born 15 weeks and 4 days after mating, but usually 2, 1 of each sex. At 6 weeks, young follows mother; at 7 months, young can kill independently; family may run together 2 years. Cub becomes mature at about 3 years when family breaks up. Captive animals may live 25 years.	Once thought to be a hybrid between male panther and lioness, but this is not so. Young, 2 to 4, usually born in spring, three months after mating. Family may stay together until young are full grown and adults may live 12 years. Hunt sometimes in pairs, but more often singly.	Pairs, both parents caring for 1 to 5 young, which are born any time of year, 91 days after mating; blind 8 or 9 days; 1st teeth, 18 days; crawl at 7 weeks; suck meat at 9 weeks; eat meat at 3 months; weaned at 4 months. Black-spotted, over yellow, for first 2 to 18 months. With mother 1 to 2 years. Live to 5 years.
FOOD HABITS AND ENEMIES	Food: flesh, fresh or carrion. Attacks almost invariably from ambush, striking at flank or throat below jaw of buffaloes, zebras, antelopes or giraffes in Africa. In Iran, lives on wild pigs; in India, on deer, horses, and cattle. Can leap 12-foot fence or more than 40 feet, or dash 100 yards at 60 miles an hour.	Food: flesh, with individuals favoring different kinds. Some animals favor game such as deer, wild pigs; others favor cattle, horses, sheep or pigs; a few favor man, the man-eaters usually, but not always, being females. Prey is seized in a rush or spring of about 15 feet or less, grasping forequarters with claws and biting throat.	Food: captured by long leaps and often by pursuit, seizing prey by throat, breaking spine or strangling it, meantime tearing front with powerful claws. Eats antelope, monkeys, deer, calves, sheep, goats, pigs, donkeys and favors dogs, the latter sometimes being caught in broad daylight, though most hunting is done at night. Can swim.	Food: meat, a full meal equalling 7 to 8 pounds of deer meat. Can drag 900-pound horse 300 feet on snow. Of 43 stomachs examined, 34 had deer; 2, corn; 1 each, skunk, cat, hog and calf. Can jump up 15 feet or down 60 feet in safety, and ranges often 20 miles a night over a 60-mile territory claimed by individual. Kills by biting neck.
RELATIONS TO MAN	Serves role of natural check on plant-eaters. Prized as game. Old individuals may become man-killers. Normally, will not annoy man unless in danger; then fights powerfully with teeth and claws. Appears in earliest recorded history, in the Bible, and figured prominently in early Roman sports. Can be trained to perform well.	Known to have killed as many as 60,000 cattle, sheep and goats in India in a year, and as many as 4,000 humans in 6 years; one animal credited with 80 men in one year. Male usually roars when hit with bullet but female does not. Prized by big-game hunters but feared greatly by natives. Sometimes hunted on elephants.	One of most wary of beasts, and most treacherous, powerful fighter when wounded. Less suspicious of traps than tigers, and so more commonly trapped with goat or dog as bait. Can climb trees easily, where lions and tigers do not; so must be hunted differently, since it can run up a smooth trunk as easily as a monkey, and attack its attacker.	Troublesome destroyer of game and domestic animals where abundant, but a valuable check on plant-eaters where other checks do not exist. Favorite food deer but apparently favors horses, if available, much as black bear favors pigs; coyotes, sheep; and wolves, cattle. Should not be completely destroyed. Known only in extremely rare cases to attack man.

OCELOT *Felis pardalis* Order Carnivora Family Felidae	BLACK BEAR *Euarctos americanus* Order Carnivora Family Ursidae	POLAR BEAR *Thalarctos maritimus* Order Carnivora Family Ursidae	GIANT PANDA *Ailuropoda melanoleuca* Order Carnivora Family Ailuropodae	STELLER SEA-LION *Eumetopias jubata* Order Pinnipedia Family Otariidae
Length, 3 feet, with 15-inch tail. Weight, 35 pounds. Grayish yellow with large fawn-colored, black-bordered spots. Slender, like well-proportioned cat. Ears, usually black, with white spot below. Tail usually spotted or ringed. Hair, soft and not thick but individuals vary greatly; several varieties recognized.	Length, to 6 feet. Height at shoulder, to 3 feet. Weight, to 300 pounds. Black or cinnamon, with a white throat patch. Sometimes all brown, the "cinnamon bear" being merely a color phase of the black bear. Snout, rather long. Tail, short. Flat-footed. Inquisitive. Not normally vicious but never really trustworthy if opposed.	Length, to 8 feet. Weight, to 1600 pounds. Average male, 900 pounds; average female, 700 pounds. Shoulders, less heavy than in black bear proportionately. Sexes colored alike, uniformly white, with a suggestion of yellow; in summer, some brown appears, and the young are even whiter than the adults. No conspicuous seasonal change.	Length, to 4 feet. Weight, around 300 pounds. Conspicuously black and white, this serving as protection in contrasting snows and shadows. Fur, thick and dense. Feet, flat like those of a bear. Ears, relatively short. Tail, remarkably short. Skull, broad. Snout, relatively blunt. Claws, long.	Length of *E. jubata,* to 10 feet; female, smaller. Weight of male averages 1500 to 1800 pounds. Shoulders, heavy. Appears sleek, wet and shining, even when dry. Black, dark gray, brown, or yellowish brown to dark brown. Ears, rather long. California sea-lion, *Zalophus californicus,* much smaller; about 600 pounds.
Haunter of woods and thickets, from southwestern United States and Mexico, through South America as far as Paraguay. The allied Margay (18 inches long and 8 inch tail), with black lines and bands, is found from Mexico to Peru. Other relatives include Linked Ocelot, with chain-like markings; and the Long-tailed Ocelot.	Originally most of North America except eastern California, eastern Oregon and Washington, Nevada and western Utah. Ten or more subspecies recognized, practically all confining range to wooded areas and often common relatively near centers of population; goodly numbers taken each year in such states as New York and Pennsylvania.	Found through Arctic America near the sea in which it swims easily and powerfully, or on the ice where, because of its color, it is inconspicuous. May come as far south as Newfoundland with the drifting ice, also found in Greenland and Iceland. Has been found 200 miles from land swimming vigorously.	Native of bamboo forests in the mountains of western China near the Thibet border at elevations of 6,000 to 12,000 feet. Known to zoologists since 1869 and while originally thought a bear now believed, on basis of teeth, closer to the raccoons. Ancestry probably dates back to the Lower Pleistocene. No near relatives.	*E. jubata* breeding along Pacific Coast from Bering Sea south to Santa Rosa Island, California; most commonly seen by tourists on rocks off California coast, where their presence is well advertised at a price. Basks on rocks or dives rather awkwardly into sea, but swims beautifully. About 2500, these *Z. californicus,* believed to haul out on rocks off San Francisco.
Little known of family life but probably mates in June and bears 2 young (always 2, apparently) in September or October. South of the United States, breeding probably takes place at any time of year. Young, blind at first. Den, usually in a cave in rocks, well lined with comfortable bedding.	Mates for season only, usually in June, the 1 to 4 young being born about 7 months later. Young, small, blind and practically helpless, and mother commonly in winter hibernation. Remains with mother until fall at least being shown by her how to live successfully and being protected by her. Young, born every other year, after maturity has been reached.	Mates in midsummer, often for two months, not polygamous. Young born in January, about the size of rats, practically naked, 1 to 4. Mother remains in den nursing young until March and probably breeds every other year, the young being ⅔ grown by mating season. Young mates when 2½ to 4 years old. Aged, at 33.	Mates probably in spring and young born in January. By April, the cub has milk teeth. At 1 year, weighs about 70 pounds having gained about 5 pounds a month, on average, weighing 3 pounds when about 6 weeks old. Probably becomes mature at from 4 to 10 years of age though this is not known. Male roars loudly in breeding season.	One bull has many cows in his harem. Breeds in Bering Sea in July and at San Francisco in summer, mating taking place just after birth of the single pup. Gestation period therefore one year. The pups soon learn to swim and care for selves. Maturing and breeding when males about 6 years old; females about 3 or 4.
Food: about 5 pounds of flesh a day, including reptiles, birds, mammals, amphibia; in fact almost any form of animal life it can overpower, even though evidence indicates that cold-blooded animals may cause indigestion and cat flesh causes an itching. Each animal hunts alone, seizing prey by neck and holding to ground until death.	Food: flesh, fish, fruits, vegetables, being particularly fond of berries. Builds up reserve of fats for winter sleep. Individuals may range some 30 miles. Den, in a cave or hollow stump occupied chiefly in winter, and when young need protection. Serves as a useful check on many small species of animals. Sounds, a growl, a snort and a smacking of lips.	Food: seals, fish, shrimps, mollusks, seaweed, small land animals, grass and other vegetation, these being sufficiently abundant in long summer that the animal may put on good reserve of fat. Grass eaten much as a hog grazes. Makes powerful fighter but normally will not attack unless bothered. Can scent food or enemies many miles.	Food: believed to be solely bamboo sprouts, requiring nightly feeding for about 10 to 12 hours to supply the needs of such a large animal. In captivity, eats regular baby diet of cereals, milk, vegetables, orange juice and cod liver oil. Claws imply that it may eat fish in wild but this has not been demonstrated.	Food: fish of many kinds, crustaceans, squids and other marine animals. Animals not disturbed by men in water but take flight when they approach on land. These sea-lions formerly outnumbered all their kin from California to British Columbia.
Probably useful in controlling the smaller plant-eaters; unquestionably injurious to poultry and smaller forms of live stock; particularly destructive of pigs, kids and lambs; apparently does not attack man though fights powerfully if cornered. Caught young, can be tamed with relative ease; often kept as a pet.	Probably generally useful for hide, meat and sport. Individuals may be harmful as destroyers of sheep, pigs or chickens. Serves in some places to attract tourists. In zoos, the bear den is always crowded by visitors who enjoy watching the antics of these animals. May be trained to some degree to perform in circuses. Should not be exterminated.	Fur, excellent. Animal, valuable as zoo animal but Eskimos use the flesh, bones and hide for food, clothing and utensils. The loyalty between members of the family is exceptional and exemplary, particularly between mother and young. Worthy of protection against extermination.	One of most popular of unusual zoo animals, one keeper in New York zoo saying that while one woman asked him about an aardvark, 30,000 asked him where the giant panda was to be found. Antics tremendously amusing partly because of playfulness and grotesque appearance. Popularity should increase with knowledge.	Rather serious enemy of fish but has some commercial value as pet, as circus animal and as natural curiosity as well as serving as a possible source of oil and leather. Fur, practically valueless as compared with close relative, the fur seal.

(Continued from page 559)

who had never seen these animals. One child going through a western zoo was so ill-informed as to where the milk she drank came from that she called her mother to the eagle cage to see the eagle from which she had understood it came. There is still opportunity for improvement in this general direction, and for us to add to our displays of wild animals representatives of the local bats, moles, shrews, mice and rabbits, with special effort being made to show how the lives of these creatures are interwoven with each other and with our interests. It is all very well to know about a lion but it is better to know what to do to the bat that gets in your bedroom at night. Many of us know more about whales than we do about quails or snails or the trails of mice, rabbits and foxes. We were taught that K stood for kangaroo, not the kingbird, and it is true that more people would recognize the kangaroo than would recognize the kingbird. This may point an objective for the zoos of the future.

There has long been a literature and a folklore associated with the common animals of the circus and the zoo. Many of us were brought up on Kipling's "Jungle Books" and his "Just-so Stories." Through them we learned to have a sort of sympathy with the black panther, to fear the tiger, to like the bear, and to feel a kinship with the wolves. We were given an attitude towards them that may not have worn away easily. We learned about elephants from "Toomai of the Elephants", and when we saw "Elephant Boy" in the movies we checked the efforts of the photoplay producers with our own impressions gained years earlier. These literary efforts have much to do with decisions we may make on the fates of many animals, and they should be of a rational type. We do not imagine that the elephant got his long nose because the alligator pulled it to that shape, but we did sympathize with the little fellow in his difficulties in the "Just-so Stories." Now, we need something just as well done, and which gives us something more nearly approximating the truth.

Our folklore is full of references to circus animals. We talk glibly about the straw that broke the camel's back, and about straining at gnats and swallowing camels.

Shakespeare in "Macbeth" attempts to build up the impression of bravery in a man by parading before him a number of familiar circus beasts. He says:

"What man dare, I dare,
Approach thou like the rugged Russian bear,
The armed rhinoceros or the Hyrcan tiger,
Take any shape but that, and my firm nerve
Shall never tremble."

Possibly, what we like in the circus is the thrill that goes with a potential threat to our safety. An ancient proverb says:

"Two things only the people anxiously desire,
Bread and the Circus games."

As explained earlier, these circus games may be those of the athletic type, but when the proverb was written they referred to knock-down, drag-out meetings between men and wild beasts. Jeremiah's reference to the Ethiopian and his skin, and the leopard and his spots, points to a finality of circumstances that both man and beast must face. Our only hope is that the predictions of the optimists may be reasonable; that some time sworn enemies may get along together harmoniously. When the "wolf shall dwell with the lamb and the leopard shall lie down with the kid" we hope it will not be like the "lady and the tiger" and that the "smile on the face of the tiger" may not be one due to his ladylike meal. In these hectic international times, it almost seems as though if the leopard does lie down with the kid, the kid would be inside. But somehow some of us hold to the idea that apparently irreconciled things can be made to be harmonious. Perhaps a study of the ways of wild animals in the open, or in the cages of circuses and zoos, would be a good thing for all. An ancient proverb says:

"The Indian tiger keeps peace with the savage tiger,
There is agreement among themselves with cruel bears,
But man makes small account of beating out
The deadly sword on the accursed anvil."

It may be a question as to whether man or the beast belongs behind the bars. Let us continue to work towards a better understanding on both sides of whatever may divide us from our fellow-men and from our wild brothers.

Books lately published that relate to the tenants of circuses and zoos include the following. All are illustrated.

Big Zoo, by William Bridges. The Viking Press. New York. 1941. (Care of the inmates of the Bronx Zoo.)

My Life in a Man-made Jungle, by Belle J. Benchley. Little, Brown and Company. Boston. 1940. (Experiences in the San Diego Zoo.)

Lions, Wild and Friendly, by Eric F. V. Wells. The Viking Press. New York. 1934. (Remarkable success with captive lions.)

Our Small Native Animals, Their Habits and Care, by Robert Snedigar. Random House. New York. 1939. (American mammals, with other groups, in captivity.)

The Wilderness Lives Again, by Mary L. Jobe Akeley. Dodd, Mead and Company. New York. 1940. (Carl Akeley in Africa.)

China's Animal Frontier, by Clifford Pope. The Viking Press. New York. 1940. (Collecting vertebrates in China.)

Wild Animals in Britain, by Frances Pitt. Charles Scribner's Sons. New York and London. 1939. (On recent mammals.)

Wild Animal Neighbors of the Countryside, by Joseph Wharton Lippincott. J. B. Lippincott Company. Philadelphia, New York, London, Toronto. 1938. (Mammals and other higher vertebrates of eastern North America.)

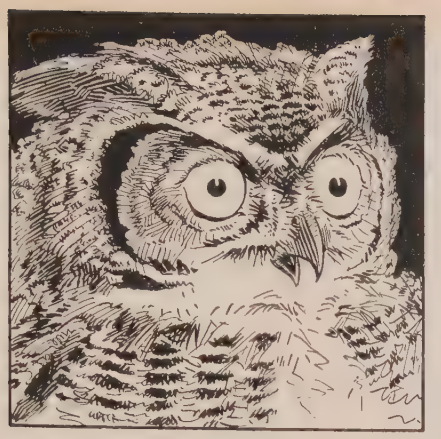
Sierra Outpost, by Lila Lofberg and David Malcomson. Duell, Sloan and Pearce. New York. 1941. (Mainly on habits of coyote; other mammals and birds considered.)

Parade of the Animal Kingdom, by Robert Hegner. The Macmillan Company. New York. 1935. (Pages 515 to 664 devoted to mammals.)

Field Book of North American Mammals, by H. E. Anthony. G. P. Putnam's Sons. New York. 1928. (Taxonomy, description, distribution, food, enemies.)

Animal Life in Deserts, by P. A. Buxton. Edward Arnold and Company. London. 1923. (A study of the fauna in relation to the environment.)

As We See It



GARBLED FACTS ABOUT WILDLIFE

"BOISE, Oct. 7 (AP) — Good news for duck hunters was brought to Boise today by Will J. Reid of Long Beach, Calif., leader in Ducks Unlimited.

"Reid, here to confer with C. J. Westcott of Boise on progress of the organization's move to increase the national duck population, said that in 1935 there were only four ducks per hunter whereas now there are 10.

" 'One person out of every 26 is a duck hunter,' he said. 'In New York only one person out of every 500 hunts ducks and in California the ratio is one out of every 100.' "

The above Associated Press story originated in Boise, Idaho, and was printed in newspapers throughout that State, at least. It is printed here as an excellent example of the garbling of facts about wildlife and conservation, and as an indication of the resultant confusion and misinformation that must exist in the public mind. The headlines over the story read: "Duck Population Reported at 10 Birds Per Hunter."

In justice to the gentleman quoted in the story it must be concluded that he must have been misquoted, even, possibly, in the direct quotes credited to him. Although some of the published claims of Ducks Unlimited in the past have been open to serious question, it seems incredible that Mr. Reid could have made any such statistical assertions as these.

It is amusing to examine these figures in the light of known facts. The best key to the number of duck hunters is, of course, the sale of the migratory bird hunting stamps, or duck stamps. For the 1935-36 season 448,204 stamps were sold. At four ducks per hunter that would have made the duck population about 1,800,000. Although at that time the duck population was at a dangerously low figure, experts never placed the numbers at less than 20,000,000. For the 1940-41 season 1,257,313 duck stamps were sold, and at ten birds per hunter the present population would be, according to the newspaper story, some 12,500,000. Optimists set the present duck numbers at at least 70,000,000.

The clue to these weird figures may lie in Mr. Reid's statement that "one out of every 26 is a duck hunter." We suspect that this is an accurate quotation, since Ducks Unlimited likes to emphasize the numbers and influence of duck hunters. However, such a figure hardly accords with the facts when one considers the population of the United States and the number of duck licenses and stamps sold. The ratio is, obviously, 1 out of every 130.

While toying with these figures it is interesting to note the allocation of ten ducks to a hunter. The bag limit is ten ducks to a hunter, so if this number were correct, and each hunter got his legal bag one day during the season, we would run out of ducks very quickly. Even with sixty ducks per hunter, which probably is more nearly the truth, it is plain that many successful days by many hunters in the duck blinds can make terrific inroads into our migratory waterfowl population. And one sad circumstance about hunters and ducks is that no one knows how many ducks are killed by the hunters. No one knows because the hunters do not care to tell. If the approximate total killed for any one year were known, by the use of a factor that has been determined by those who band birds the total duck population for any year could be calculated within a few thousand.

There is another implication in this garbled newspaper story that we do not like, and never will like. That is the assumption that, whatever the number of ducks, they all belong to the hunter. None, in the duck hunter's mind, apparently belongs to the 129 out of every 130 Americans who do not shoot ducks. This is, of course, the philosophy of Ducks Unlimited, which seeks to create the impression that the sportsmen are creating the ducks and have the sole right to them. If the migratory waterfowl had been left to the sportsmen alone—save for the awakened few—and they had been allowed to make the regulations during the precarious years, the ducks would now be one with the passenger pigeon. Live decoys and baited waters would have been used right up to the last volley against the last duck.

But this is aside from the erroneous impression created by such newspaper stories as the one quoted here. There have been many others like it, and they contain lessons. One is that anyone permitting himself to be quoted about a subject such as this should be super-careful to see that the facts given are *carefully* given. Another is that reporters and copy editors owe it to the public to use equal care—and some common sense—in what they send out to the composing room and press room to be perpetuated in type.

Conservation Comment

A steady rise in the number of Federal migratory bird hunting stamps was recorded for 1940, according to the compilation of the Fish and Wildlife Service. A total of 1,257,313 stamps were sold for the 1940 season, representing a substantial increase over the figure of 1,111,561 for the previous year. In other words there were nearly 150,000 more hunters to drain away the supply of migratory waterfowl.

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"The wood duck, *Aix sponsa,* is regarded by many as the most beautiful duck of our fauna, the male being indentified by its green and purple head streaked with white, white throat, reddish breast, white underparts, light brown sides, pinkish bill and orange feet," says an article in the October, 1941, *Alabama Conservation,* recording the pleasure of sportsmen at the return of this bird to the shootable list. Somehow or another, it is difficult for us to reconcile the recognition of such avian beauty by those who are exulting at the prospect of being allowed to destroy it.

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Proof that public education is important is found in the 1941 regulation closing the season on snow geese in Idaho so that real or fictitious excuses for shooting the rare trumpeter swan by mistake will no longer hold water. The Emergency Conservation Committee sent Mr. George Marler on a lecture tour through Idaho, during which he gave 74 lectures to 24,687 people. Cooperative support of protection resulted. Such a program should be extended into Utah, and it is hoped that this will be found possible.

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Report of progress comes from the Canadian Department of Mines and Resources in its protective work in behalf of the eider duck. Patrol officers announce a productive breeding season and a successful harvest of eiderdown, which is gathered without disturbance to the birds. This annual check-up showed that other sea birds, including puffins, murres, razor-billed auks, guillemots and several species of gulls and terns, had enjoyed an equally satisfactory season.

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Bombs and wildlife obviously do not mix, and these days the War Department is seeking areas for use as bombing ranges and other military purposes. Cooperation between the War Department and the Fish and Wildlife Service has been set up to prevent destruction of important wildlife areas and their inhabitants by such projects. Albert M. Day, liaison representative of the Wildlife Service reports an appreciation of these values on the part of Army officials. It would seem, however, that the Service gave in rather too easily by permitting use of a large area of the Cabeza Prieta Refuge in Arizona, which supports a remnant of the Gaillard bighorn sheep population.

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The Department of Conservation of the State of Tennessee issues an enthusiastic release publicizing "a new American sport—hunting ferocious Russian wild boar." The animals were brought to this country from the Ural Mountains in 1912 by Englishmen and placed on a leased preserve. They later escaped to the forest and have increased. We hold no special brief for these boars (or other introduced animals, for that matter) but we cannot help questioning whether it is human progress to boast that a "thrilling pastime of medieval days will be revived with a flourish of modern arms and methods." There is altogether too much medievalism and flourishing of modern arms and methods these days as it is.

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The publication of the *1941 Yearbook, Park and Recreation Progress* represents the fourth consecutive issue of this publication. It contains an extremely interesting and important summary of park and recreation activities down to date. There are illustrated articles by men in the field, and these and other data presented are valuable to all interested in this activity. Copies are available at forty cents from the Superintendent of Documents, Washington, D. C.

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The 1941 travel year saw a new high in the number of people who visited our national parks, monuments, parkways and national recreation, military and historical areas under the jurisdiction of the National Park Service. The total tabulated showed 21,050,426 visitors, being an increase of 4,308,571 above the figure for last year. The most visited national park was the Great Smoky Mountains National Park. The Canadian national parks also showed a substantial increase, with visitors from the United States now constituting 23 percent of the total attendance.

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Naturally

By H. A. BOLZ

Worms will turn but rarely rotate,
Fish will school though little learn,
Spiders spin and seldom gyrate,
Fireflies glow but never burn.

It is a pleasant custom, rich in history, to turn, once each year, to—

Christmas Greenery

By ANDREW S. WING

Garden Editor, Nature Magazine

Photographs from J. Horace McFarland

THE pleasant custom of using evergreens, red berries and mistletoe during the Christmas season is older than Christianity. It derives from ancient pagan rites and beliefs of Saxons and Druids. Fascinating as may be the mystical origins of our Yuletide customs, we are, however, practically concerned today with the ways and means of brightening our homes at the jolliest and best of holiday seasons.

In days of old the good husband, aided by a sturdy son or two, beat a path into the snowy forest to fetch a fine young spruce or balsam. Installed in the kitchen, safely away from the fireplace, it was garnished with bits of tinsel, colored paper, popcorn and home-made candles. In New England mistletoe was then unknown, although it grows and was used from Virginia south. Our mistletoe, incidentally, is a different species from the traditional one of Europe, although they are similar in appearance. But mistletoe is incidental to Christmas anyway, its sentimental value being greater than its beauty. The basic substance of all Christmas decoration is the evergreen, symbol of eternal life. Holly, spruce, cedar, pine and hemlock are the most common forms. The scope has been materially widened as the planting of evergreens in variety has come into more general use. Nothing, for instance, could be finer than the dark green of the Japanese yew, and for decorative value the pines are hard to beat.

The simplest—although not the most interesting—way to decorate for Christmas is to visit the corner store and stock up on everything from a fir tree to holly wreaths, tinsel and all the trimmings. Lights may have to come from another source, and a shopping tour of the dime stores will be productive of glass bulbs, tinsel, and the other trimmings, which either make or ruin a good tree. Few of us will ever be in a position to go out into our own woodlot and whack off a tree for the holidays. Theoretically this is easily achieved, but wait until you nurse along a fine row of young spruces from pot size to ten-footers and see how loath you are to cut them down, even if they are crowding one another! When you can buy a fine young balsam fir or spruce for a dollar or two, who can have the heart to murder one of his own? Dig up a smallish one perhaps to be set back in the ground later

on, but to whack it off—that is something else again.

But to prune, trim or otherwise cut back the growth of one's evergreen shrubs and trees is quite another matter. A skillful pruner can take enough decorative material out of a fair-sized evergreen planting to decorate several houses, and the plants will be the better for it, especially if allowance has been made during late summer and fall for such a harvest. The practice of going into the woods to bring back a haul of cedar, hemlock, laurel, ground-pine and berries is discouraged because of inroad into the supply of rarer plants. More and more, in fact, this sort of thing is becoming illegal, so the wisest idea is either to grow it yourself or buy it.

Since we are more interested in Christmas greenery from the garden angle, let us first take a look at what we can grow ourselves. First of all comes holly, the most truly traditional of our Christmas trees.

There are, of course, many sections of the country that are too cold, dry, hot, or in some other way unsuited for the growing of our native American holly, *Ilex opaca.* But, also, there are many thousands of square miles where no holly is now growing, where it would grow happily and with little protection, if it were given a fair trial. For instance, holly grows native in southern New Jersey and from there south along the Atlantic seaboard to Florida and thence to Texas. It is not now found growing wild in Connecticut and Rhode Island. But near Sandwich on Cape Cod, Massachusetts, it is fairly abundant, indicating that it is not climate that is against it in the intervening territory, or even soil, but some other factor that has caused it to skip from New Jersey to the Cape. It probably was fairly common at one time in this New England coastal area and perhaps was exterminated in some manner by the Indians or early settlers.

In recent years a revival of interest in holly has caused a much wider distribution of it than before. It can now be had in small sizes at low cost from many nurseries, and even fairly large sizes are not too costly. If you live in the natural holly habitat, do by all means plant it; and even if you are in the marginal areas of mid-North or mid-West, it may be possible for you to grow it in a partially shady and sheltered location. It likes a soil filled with leaf mold that is rather on the acid side. Balled and bagged it is not difficult to move during the dormant season. One should be sure to buy a strain guaranteed to bear fruit, as the male trees do not have berries. Once established, you can clip your holly fairly heavily every Christmas without harm, in fact it will be a taller and more shapely tree if some clipping is done.

This is the American holly of which we are speaking—the familiar one. There are a number of other species, mostly deciduous or else not hardy in the North. One that is hardy and worth having though it is not evergreen is the common swamp holly, *Ilex verticillata,* or winter berry, whose bright red berries are often seen in marshy places or in florists' windows.

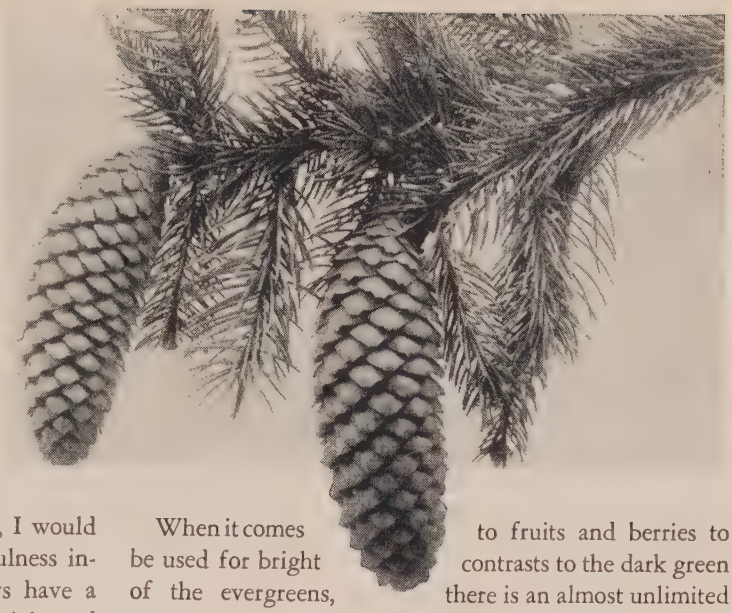
Those fortunate enough to live in the Puget Sound region of Oregon and Washington, or in other milder regions, can grow the true English holly, *Ilex aquifolium,* which has a glossier leaf and somewhat larger berries and commands a premium in the holiday trade, although its superior beauty in the garden is a matter of opinion. There are many horticultural varieties of the English type, some of the best of which are of Dutch origin.

Well do I remember my visit to the holly farm of P. H. Peyran of Gig Harbor, Washington. Perched on a plateau overlooking Puget Sound was a cozy little cottage, surrounded by a grove of holly trees of a fine Dutch strain. There were at that time, as I recall, about 600 trees that had been pruned into symmetrical 15-foot spires. Very, very beautiful indeed was this little holly orchard, and at that time Mr. Peyran, a retired salesman, was harvesting a crop of holly branches and berries every December that grossed $6000, from which a relatively small amount of labor and shipping expense had to be deducted. What an ideal life, I thought; what a perfect kind of a farm for a lovable old couple to spend their sunset years on! Ever since then, I confess, it has been my own as yet unfulfilled ambition to own a holly farm here in the East. They are bound to come, and those who have the patience and foresight to wait eight or ten years for their holly to grow to a marketable size will reap a rich return in both a material and a spiritual way.

Meanwhile, the largest part of our holly crop still comes from commercial collectors who beg, buy, or steal it from farms and woodlands in the Atlantic coastal area. Much of our mistletoe also comes from this region, but since this plant is a parasite and is only used in small sprays, one

need not worry about the danger of its extinction.

Another Pacific Northwest native that is a charming addition to any home grounds is the *Mahonia* or Oregon holly-grape. While technically a member of the barberry family and a shrub rather than a tree, its bronzy-green leaves turn a rather reddish-brown shade in winter and so closely resemble the typical holly form that they are readily mistaken for that family. My mother has made wreaths of this for many years from plants growing on the home farm in central Ohio, and it is truly a lovely addition to our Christmas decorative scheme.



While the white spruce probably leads in popularity of the home-grown Christmas greens, I would place several others ahead of it in general usefulness indoors and outside. Certainly the Japanese yews have a richer color, which they hold well, and their bright red berries are a welcome contrast to the dark needles. Personally, I am partial to some of the junipers for indoor use, notably those that have the frosty-green effect of the low-growing native junipers, or the brighter green of the Chinese varieties. Hemlock is definitely one of our finest evergreens for general use, but it has the annoying habit of shedding its needles almost as soon as the first breath of warm indoor air touches it. Some of the pines are very decorative, although rather too stiff for graceful wreaths, and the long-leaved species from the South are strikingly beautiful for doorway arrangements or along the fireplace.

Mountain laurel is, of course, unexcelled for ropes and wreaths, but since it is banned from commercial collecting in many states, one should not encourage the pilfering of this beautiful shrub by patronizing its commercial exploiters. Nothing is finer than ground or princess pine for the same purpose, but it, too, is in danger of extinction in certain sections.

There are now available several hardy varieties of evergreen barberry, some of which have leaves that are quite as interesting as holly and with long, wicked-looking spines. *Euonymus,* or winter creeper, is fine for indoor decorations, the longer pieces of the small-leaved varieties being particularly graceful. Of course one should not forget the many handsome forms of the English ivy, which grow well in most humid sections of the country if kept on the north side of a house or wall, or in partial shade. Honeysuckle, too, is fine for use in bowls or vases indoors or for draping over the mantelpiece or tall pieces of furniture.

Almost all of these things will keep better if their stems are placed in water; in fact some can be kept all winter if the water is changed occasionally.

When it comes to fruits and berries to be used for bright contrasts to the dark green of the evergreens, there is an almost unlimited supply in every community and in most well-planted gardens. To swamp holly, already mentioned, may be added Japanese barberry, rose hips, bittersweet, Chinese lanterns, chokeberry, bayberry, the viburnums, including the hobblebush which has red berries. Attractive arrangements can be made with cones of various sorts, and the use of fruits such as apples and oranges is coming into popularity for both outdoor and indoor decorations with evergreens as backgrounds.

The lighting of outdoor trees for Christmas seems to be dying out, perhaps because for several years it was overdone. In place of this are now seen some clever and artistic doorway and window effects, with indirect or flood lighting. An arched doorway with a simple wreath hung on it, lighted with a concealed outdoor electric fixture, can be more effective and subtly suggestive of the Christmas spirit than a 50-foot spruce tree covered with red, white and blue lamps. I actually saw such a tree on a suburban estate last year, and while it would have been appropriate for Times Square, it did seem a bit bizarre for an old Colonial house in the country. This is not to condemn the outdoor lighting of trees, for they can be quite lovely if well done, but it seems a bit lacking in imagination for every house in a block to use exactly the same kind of outdoor Christmas decorations.

Last of all do not forget to give the birds a little Christmas cheer. A few evergreen boughs around their feeding stations will be appreciated and red apples and some berries will help attract new visitors and brighten up the feed boxes at the same time. The Yuletide season should be primarily a time when we think of others, and among these may well be our bird friends and neighbors whose lot during the severest weather is not an easy one.

PHOTOGRAPH FROM THE U. S. DEPARTMENT OF THE INTERIOR

IN THE PROPOSED EVERGLADES NATIONAL PARK OF FLORIDA

A typical view of palm hammocks near Ochopee, Florida. This palm is the cabbage palmetto or sabal palmetto, a striking member of the large palm family that circles the globe in warm climes

The Florida Everglades, perhaps the site of our next National Park, is—

America's Last Frontier

By KENNETH D MORRISON

Gliding across the many colored waters of Florida Bay this warm summer-like afternoon I seem to have been transported to Fairyland where there is no such thing as worry and depression. This is the heart of nature with nothing but beauty on every hand . . . the smooth water studded with green islands and the graceful plumes of coconut palms and other tropical trees standing out against the blue and white of sky and cloud.

Returning from a week's cruise through tropic islands, up and down beautiful inland rivers between canyon-like walls of solid green, bathing and shell hunting on sandy beaches and watching the Herons, Pelicans, Cormorants, Ibis and other water birds returning to their roosting places just before sundown . . . something new and wonderful every hour of the day. —W. M. Buswell

INSTEAD of being written in 1933, this idyllic passage might have been torn from Ponce de Leon's diary in 1513 when he was searching for the magic waters of the Fountain of Youth.

Nature-loving Americans will rejoice to learn that this great primitive region—the southern Everglades in Florida—is authorized by Congress for inclusion within the National Park system, and, as Everglades National Park, may be the next addition to the family of these reservations.

To some tourists the Everglades is a dull, monotonous region. To others the ride across the Tamiami Trail, which penetrates the northern section of the authorized park area, is a thrilling journey into a land of exotic enchantment. Wood and white ibis, several species of egrets, herons and other fascinating wading birds, together with many interesting native birds of the region, are frequently observed from the Trail, and sometimes in great flocks. This is true especially of the wading birds, which during the winter season congregate in the Everglades by the hundreds of thousands, creating a spectacle of inspiring interest. Brightly-clad Seminole Indians poling their way along the Trail canal in their canoes fashioned from great cypress trunks are picturesque features of the Everglades, one of America's last primeval wildernesses.

Because of its many swampy areas and the difficulty of water control, the Everglades remain relatively unspoiled. This is specially true of the section authorized for the Park. The Tamiami Trail is the only highway that cuts across the 'glades from coast to coast. Driving along the Trail, one half expects to encounter a sign bearing the legend "Brink of the World—10 Miles." For at first glance the Everglades is not a friendly place. Probably it is fortunate that few have taken a second look. If they had, they would have discovered behind the veil of sabal palms and Caribbean pine, out toward the horizon where the cypress finger the clouds and the wild turkeys strut, a trackless land of sleepy tranquillity that has yet to be violated by the roar of motor boats or the reminders of thoughtless campers. National Park status will assure protection from these many evils.

The movement to set aside a portion of the Everglades country for the enjoyment and inspiration of present and future generations has not developed overnight. For more than a dozen years white-haired, Nature-loving Ernest

PHOTOGRAPH FROM THE U. S. DEPARTMENT OF THE INTERIOR

NATIVE ROYAL PALMS IN ROYAL PALM STATE PARK, FLORIDA

These palms are native to south Florida only and are found within the proposed boundaries of the Everglades National Park. Here they tower above a low-growing thicket in the mysterious Everglades

F. Coe, director of the Everglades National Park Association, has been prodding his fellow Floridians to take action to save the Everglades before the blight of commercialism spreads from the shore-line of the Gulf of Florida into the back country.

During the late twenties, Mr. Coe had occasion to make many trips into the heart of the region that has been termed "America's last frontier." He was distressed to discover that the 'glades' unique bird and mammal life was being decimated by sportsmen and market hunters and that rare orchids as well as other rare tropical vegetation was being uprooted on a wholesale basis. He observed, too, that deer, turkey and other game were suffering from serious inroads.

A chance remark at the breakfast-table by Mrs. Coe to the effect that the creation of a National Park would afford protection to the remarkable fauna and flora of the Everglades offered the inspiration that induced Mr. Coe to spend these years stimulating public opinion and sponsoring legislation to the end that the only area in North America lying within the climatic tropics be established as a National Park. Thus exploitation would be checked before the Everglades became as wild and unspoiled as Coney Island.

That this National Park project still remains some distance from accomplishment does not discourage Ernest Coe. Leaning back in a swivel chair in the Miami office of the Everglades National Park Association, he recalls that "it took twenty-two years to get the Great Smoky National Park." He adds, with an optimistic smile: "Why, this project is still young."

As early as 1934 Congress passed the enabling act that authorized establishment of an Everglades National Park as soon as the state of Florida turned over the designated lands to the Department of the Interior. The proposed park area includes approximately 1,280,000 acres in the tip of Florida, mainland and surrounding waters and islands, which is less than one-fourth of the total extent of the Everglades. The eastern boundary of the tentative park line is penetrated by the Tamiami Trail at a point about 35 miles west of Miami. Most of the territory to be included is south of the Trail, however. The park will encompass a large number of the Ten Thousand Islands, as well as an eight mile strip on Key Largo, whose coastal waters support one of the world's finest marine gardens and a barrier reef. These features, in addition to the abundance of tropical vegetation and characteristic birds, fishes, reptiles, mammals and insects, combine to produce a pageant of natural history and scenic tropic beauty that cannot be duplicated in any preserve ever to be established in the United States.

Under the leadership of the Everglades National Park Association, and its director, Ernest F. Coe, the plan for the preservation of this area through its establishment as a National Park has progressed slowly and steadily. Complete study of the area has been made. Congress has authorized the Park, leaving it for the state of Florida to complete the acquisition of the land. Governor Holland of Florida is actively pushing the project, recognizing not only the local but the national importance of the project. It is to be hoped that the momentum already gathered will carry the movement on to a speedy conclusion.

Since 1929 the Florida legislature has passed more than a dozen bills designed to expedite the establishment of the Everglades National Park. By presidential proclamation in 1934, all federal lands within the park area were withdrawn from other than for National Park purposes. By virtue of these acts, approximately half of the region desired can be made available for park purposes, the remainder consisting of land that is still privately owned. The Everglades National Park Commission, created by the Florida legislature, has as its purpose the acquisition of these private lands. They must be acquired by negotiation or condemnation by the state before it can turn over the whole parcel to the federal government.

No conservation project would be complete without its bugbear. In the case of the Everglades park, it is oil—or more accurately—the vision of oil. Apparently certain business interests are not willing to concede that the best utilization of this amazing region is for a National Park, a natural reservoir of native wildlife, and a recreational region within America's only climatic tropics. Peace is short-lived these days, even in Nature, and man is rarely reconciled to the existence of "unproductive" areas. So, drills have been pounding into the Everglades from time to time. Two wells have penetrated to about 5000 feet, and one has driven to the depth of 10,006 feet. None show signs of oil, and the deep one was officially declared a "dry hole". Another is now being driven and is down about 3000 feet with no promising signs of oil. If oil is discovered in commercial quantity it will, of course, mean wealth for the promoters, but in such remote case death would not take a holiday for the diverse wild population that depends upon unpolluted waters as feeding grounds.

PHOTOGRAPH FROM THE MIAMI DAILY NEWS

ACROSS THE SAWGRASS PRAIRIE

This sort of scene is also typical of the proposed park area, a region that well merits the protection that National Park status would give it

Daniel Beard of the Fish and Wildlife Service, who spent many years in the Everglades, had this to say concerning the ecological upset that would follow the discovery of oil: "The fresh water shrimps, minnows, insects, and various other organisms that are so abundant in those big feeding areas of the Big Cypress and the open 'glades would be affected by oil or brine. Especially in the 'glades we can anticipate that seepage would cover extensive areas and settle in 'gator holes or solution pits in limestone where aquatic organisms are most abundant. Roughly speaking, those organisms are the basis for all higher forms of animal life in the country—white ibis, wood ibis, various egrets and herons, anhingas, swallow-tailed kites, marsh hawks, black-necked stilts, Everglade kites, limpkins, alligators, raccoons, otters, etc. Yes, I think there is considerable danger. An oil boom in the Big Cypress would open up a wilderness and many people would go into areas where only a few Seminoles and more courageous sportsmen go now. That also is a threat."

Hundreds of thousands of dollars have been spent over a period of years on oil exploration work in Florida, without a penny in return, so far. Yet, despite discouraging results, several oil companies and independent land speculators today hold options on millions of acres of Everglades land. As long as even the mirage of oil derricks hovers grimly over South Florida, these groups will quietly attempt to thwart efforts to remove any land from private ownership. They are the probable instigators of the move to test the legality of the state of Florida's relinquishing its mineral rights to the park lands—a provision required by the Department of the Interior. A ruling on this point by the attorney-general is pending.

Park service officials who visited Florida last winter are enthusiastic about the Everglades park project. They are particularly optimistic because of the favorable attitude of Florida's new governor, Spessard L. Holland. However, Newton Drury, director of the park service, emphasizes the fact that according to the act of Congress authorizing the Everglades National Park, the state must acquire title to the entire tract and turn it over to the federal government in fee simple before the park service can take any sort of action. Governor Holland has suggested that in the interim the U. S. Fish and Wildlife Service accept custodianship of the lands in order to conserve the bird life and other natural assets of the region. Secretary Ickes replied, "I should be willing to accept the lands under that condition for administration and protection by that service until such time as the lands could be made available in fee, and the area established as a National Park."

Because the Everglades is important as a vast breeding ground for birds, some conservationists have voiced the opinion that the area should be designated a wildlife sanctuary rather than a National Park. In stating his views on this question, the late George M. Wright of the National Park service said, "The argument was advanced that National Park status would bring development and people and that these would be detrimental to the breeding colonies. I feel that the usually opposing functions of pleasure grounds and game sanctuary could both be developed in this instance without prejudice of one cause or the other. This is due to the terrain of the Everglades itself. The visitor cannot wan- (Continued on page 578)

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

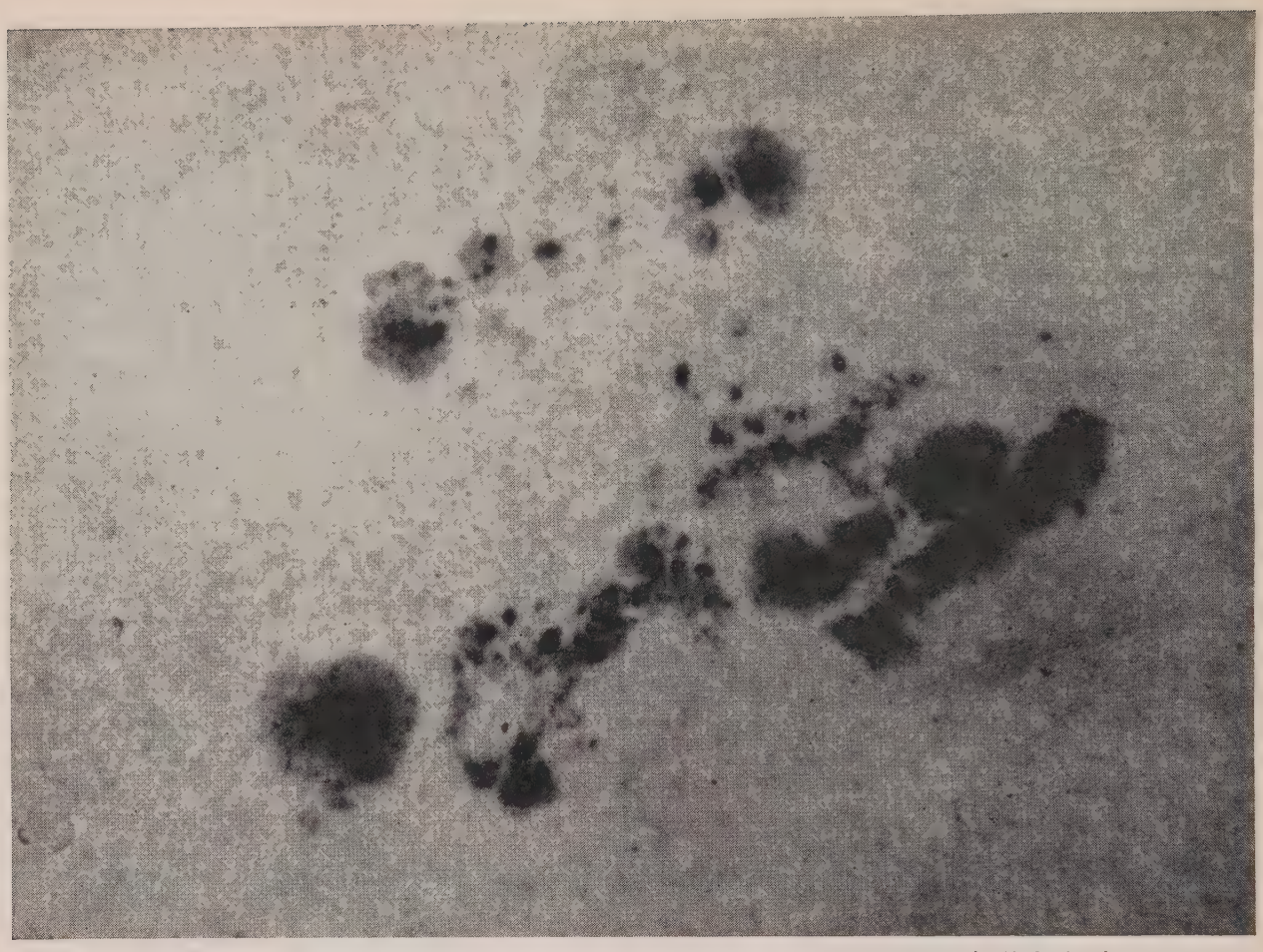
Sunspots, Magnetic Storms, and Auroras

By ISABEL M. LEWIS

A LARGE and actively-developing group of sunspots, particularly when it is approaching the central meridian of the sun, is always an object of suspicion and concern to the astronomer who keeps records of the life-histories of such phenomena. Sunspots are solar storms that may, and frequently do, have a very direct effect upon terrestrial affairs. Great magnetic storms may sweep over the earth, disrupting radio and telegraphic communications, causing fade-outs and garbling messages, while auroral displays of unusual intensity may be visible in widespread areas where generally they are rarely seen, as a direct result of solar activity in sunspot regions. Such a great sunspot group caused the remarkable auroral display of September 17-18, and the severe magnetic storm that accompanied it. This group had passed the central meridian of the sun some hours before, and it has been fairly well established that the disturbances in the earth's atmosphere that are associated with solar eruptions follow anywhere from eighteen hours to two and one-half days after the passage of the disturbed area on the sun across its central meridian.

In every sunspot region there is a magnetic field of greater or less intensity. From these regions are shot forth streams or bundles of electrified particles, which penetrate the upper atmosphere of the earth, not immediately with the velocity of light—in which case they would reach the earth in a little more than eight minutes—but after a number of hours. These electrified particles, or corpuscles, set up disturbances in the earth's magnetic field. These cause magnetic storms, auroral displays and disruptions of communications.

The earth itself behaves as a great magnet. It has its magnetic poles in high northern and southern latitudes, although at some distance from the poles that are the extremities of the earth's axis of rotation. Midway between the magnetic poles lies the magnetic equator.



Enlargement of photograph of the great sunspot group taken on September 17, 1941, at the U. S. Naval Observatory by Mrs. L. T. Day. The great activity of this group and its position near the central meridian of the sun led to the prediction of the great magnetic storm of September 18 which was accompanied by a remarkable auroral display visible as far south as Florida.

Like any other magnetic field, the earth's field has its lines of force converging toward the magnetic poles. Minor and local disturbances of this field are continually taking place because the bombardment of the upper atmosphere by streams of electrified particles from the sun is always more or less variable in intensity. These electrified particles enter the atmosphere with spiral motion and are drawn toward the magnetic poles following the lines of force. The luminescence of the aurora is produced by the bombardment of the gases in the upper atmosphere, chiefly oxygen and nitrogen, by these streams of particles entering the atmosphere.

The aurora polaris produced by these disturbances of the earth's magnetic field is always observable in what are known as the auroral zones in high latitudes. It is only when magnetic storms of great intensity occur that auroral displays are observable in lower latitudes as well. They are practically never observed as far south as the equator. The greater the intensity of a display the lower the latitudes in which it may be seen. Auroral displays in the latitude of Washington are not frequent. In southern Canada, and even in New England, they are seen much more frequently, while in northern Norway, Canada, and Alaska magnificent auroral displays of great intensity are common. The same is true of regions in the south auroral zone of the Antarctic.

Auroral phenomena are produced only in the upper atmosphere of the earth, usually at altitudes of 65 to 130 miles, approximately. Near Oslo, Norway, auroral streamers have been recorded as high as 465 to 495 miles and on one or two occasions at altitudes of over 1000 kilometers, or 625 miles. The lowest altitude at which they have been recorded is about 40 miles. The lower the latitudes in which the displays are observable the greater the heights at which they occur.

There are many different forms of the aurora. Among the quiet forms there are the quiet arcs and quiet luminous bands; the auroral fog, which is a luminous fog with no definite limit; the pulsating types that keep unchanged in form for a short time but undergo rapid changes in intensity. Then there are the moving types of aurora, which include luminous draperies and curtains, the lower portions of which may appear to dance up and down, giving them the name of the "merry dancers", and the rapidly moving bands that sometimes appear to have a wave motion. Very intense auroras are usually in rapid motion, and as the intensity increases there is a movement of the auroral display toward lower latitudes. Auroral draperies and curtains have been found to have cross sections unbelievably thin, sometimes only 300 to 400 yards across. The auroral crown is formed when rays appear to radiate from a point in the sky high overhead near the magnetic

(Continued from page 574)

zenith. They may appear to extend in all directions, like luminous spokes in a wheel, reaching almost to the horizon.

There are frequent changes of color in auroral displays, from deep red through pink to yellowish green, which is the color most frequently observed. The most intense line in the auroral spectrum is the green auroral line, known to be due to oxygen in the form of ozone in a peculiar state of excitation. Intense red lines also appear, due to oxygen, and nitrogen bands are very prominent. Some auroral draperies and curtains are a deep red in color at their lower borders and greenish-yellow above.

Magnetic storms and auroral displays vary in number and intensity with the eleven-year sunspot cycle. Although they are greatest during the sunspot maximum period there may be isolated storms and displays of great intensity even at the sunspot minimum. The great magnetic storm and remarkable auroral display of September 17-18 came at a time when the sunspot maximum period had passed. Large active sunspot groups with attendant terrestrial disturbances may occur at any time during the sunspot cycle but may be expected to occur with least frequency during the sunspot minimum period. The sun is now at an intermediate period in the present cycle of solar activity, with the minimum two years or more distant.

Sunspot groups, magnetic storms and auroral displays may return after an interval of twenty-seven days, which is the length of time that it takes for a group to make one complete revolution, due to the rotation of the sun on its axis in this period. A spot group is first seen at the eastern edge of the sun and is carried across the solar disk by the rotation of the sun in about thirteen or fourteen days, reaching the solar meridian in less than a week from the time when it is first seen. During this time the spot may change considerably in appearance, disappearing, or developing and becoming more active, as the case may be. If the group is large and active terrestrial disturbances may occur soon after it has passed the central meridian. After the group has disappeared at the western edge of the sun, it may undergo marked changes before it is due to return at the eastern edge after another thirteen and one-half day interval. It may subside completely, or may return more active than before, in which case a repetition of the disturbance may be expected. A large active group may return at twenty-seven day intervals for several rotations of the sun. It is a remarkable fact that on certain occasions magnetic disturbances and auroras have occurred when the sunspot region returned although the group itself had disappeared. This is an indication of the deep-seated nature of such a solar disturbance.

At the Naval Observatory at Washington, D. C., photographs of sunspots are taken on every clear day with the 40-foot photoheliograph. These photographs are of great value for they may show the development of a great and active sunspot, and give warning of the possible approach of widespread disturbances or disruption of telegraphic and radio communications. They furnish, in addition, an invaluable record of changes in solar activity over long periods of time for scientists who are engaged in a study of terrestrial magnetism and conditions in the earth's atmosphere, as well as on the sun itself.

In December Venus will grow brighter rapidly and will have its maximum brilliancy on December 29. It will set more than three hours after the sun and will be a magnificent object in the western sky in the early evening. Mars is still conspicuous in the evening sky, a brilliant red object in Pisces, outshining all stellar objects in view except Sirius and the planets Venus and Jupiter. It is rapidly decreasing in brightness as it now recedes from the earth. Jupiter is in view all night this month and is in opposition on December 8. It is still in Taurus. Saturn is also in Taurus to the southwest of Jupiter and below the Pleiades. It is now of zero magnitude and the least brilliant of the planets in view. It is a pale yellow in color as compared to the brilliant golden yellow of Jupiter. Mercury will be too close to the sun to be observed this month. The sun will reach its greatest southern declination this month and winter will begin for the northern hemisphere and summer for the southern hemisphere on December 22 at 12:45 A.M. Eastern Time.

Harvard Astronomy

The Milky Way. By Bart J. Bok and Priscilla Bok; *The Story of Variable Stars.* By Leon Campbell and Luigi Jacchia; *Earth, Moon and Planets.* By Fred L. Whipple; *Between the Planets.* By Fletcher G. Watson. 204, 226, 222 and 294 pages respectively. Illustrated. The Blakiston Company. Philadelphia. $2.00 each.

These four books should be reviewed together since they are the first four in a series entitled "The Harvard Books on Astronomy". Five more are scheduled for publication. All are being brought out under the distinguished editorship of Harlow Shapley and Bart J. Bok. The titles are, of course, descriptive of the contents of each volume. But they do not, naturally, indicate the splendid popular treatment that is given to the subjects covered. The authors and their editors have collaborated to prepare what will eventually be a complete and most up-to-date astronomical library of inestimable value to all interested in this subject. It would appear that the whole series would be an essential for every school library, and that, as a group, the books offer the answer as to what astronomy books should be on the library shelves. For reference purposes and supplementary reading in this field this series would be usable by students from the second or third year junior high school on up, and for teachers in the lower grades. Beside the excellence of the material contained within the covers, a word should be said about the books physically, for they are well and sturdily bound to withstand hard use.

Birds of America

The Birds of America. By John James Audubon. With introduction and descriptive text by William Vogt. New York. The Macmillan Company. 435 colored plates. $4.95.

This is a new and less expensive edition of the book first brought out by the same publishers in 1937. It is an attractive volume for the library table and an inexpensive item of Audubonia. Unfortunately, in some instances, the color reproductions are not all that they might be, and Mr. Vogt's descriptive text is notably brief. However, this is not designed to be an identification text, even if the owner of the book were physically equal to taking it afield with him, but a show volume. At the present price it is worth the money.

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THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

At School at the Zoo

Schools located near zoos, or near the winter quarters of our circuses, have an excellent opportunity to learn something of the animals of other lands. During the spring circus season, other schools may make a real use of the special insert in this issue of *Nature Magazine*.

The natural tie-up between the school and the zoo would be between geography and the places from which the various captive animals come. This page always seeks to suggest something different from that which usually appears in outlines dealing with different subjects; so instead of suggesting geography, we will suggest something a little different.

Instead of having our children walk around the zoo or circus copying down the names of the places from which the animals come, let us begin a more direct study and look the animals in the eye. In some animals the dark centers of the eyes will be round. In some they will be a vertical slit, and, in some, a horizontal slit. Let the children decide this for themselves from the animals they see. It is dangerous to suggest a generalization and then ask that the children see if the generalization is safe, but it will probably be found that those animals that have the slit horizontal are the animals whose center of interest is on a broad horizontal plane. The cats, which have the vertical slit, may seek their food not only on the ground but above it.

Of course, the size of the center varies with the intensity of the light. This may be noticed by any intelligent child while going through a circus or a zoo.

A few animals that retreat into dark parts of the cages may make their presence known by the glowing of the eyes, but it should be remembered that this does not take place unless light comes to the creature's eyes to be reflected. Then, when it is reflected, the color may vary. Thus we have a whole series of studies of the eyes of these captive animals, some of the results not being recorded in the usual Nature literature, and, therefore, probably most useful in stimulating independent investigations on the part of children.

Similar studies may be made for almost any other part of the bodies of animals. The feet of the speedy animals of the hard ground are usually hoofed with single hoofs; those of some of the animals of softer ground are split. These split hoofs spread when forced into soft ground and increase the base, thus not sinking as deeply as would be the case with the single-hoofed animals. A trip around a circus lot to see the tracks made by elephants and other animals is an experience never to be forgotten by one who has acquired an interest in tracks by making plaster casts of the tracks of local animals. Why not make a set of the tracks of these animals from foreign lands and exchange them with other schools? If one does not know how to make these plaster casts, directions will be sent to any addressing the author at Ithaca, New York.

The tails of animals are worth watching, both for discovering their use and for discovering, if possible, the relation between their movement and the emotional state of the animal. A swishing, lashing tail tells a different story from one that is lazily swinging. The nervous tip of the tail of a cat, the droop of the tail of one of the dogs, the raising of the tail of a skunk all have different and important meanings. These emotions can be noticed in the animals, and the children taught to translate their observations into simple sketches. Monkey's tails of course are interesting, but it might be worth while to notice that while some monkeys use their tails to swing by, others do not. If this can be observed, notice that those that swing by their tails all come from one part of the world and those that do not, from another.

If eyes and tails do not tell one about a wild animal's emotions, its lips and mouth may. Exposed teeth, drawn back ears, and squinting eyes have a meaning all their own, and they are not usually exhibited by an animal bored with its existence.

The kind of fur or hide may tell something of the kind of country in which an animal probably lives, and may also be of importance in connection with the care of the animal in a zoo or circus in the winter or in the summer. Many of the animals of the tropics must be sheltered in winter, and many of the animals of the polar regions suffer severely in summer heat. Of course, most of the animals with fur remove their coats in a varying manner. Some get their new pelts so gradually that it is scarcely noticed, but others, particularly some of the longer-haired grazing animals, shed their old hair in considerable masses, either by rubbing, rolling or by other means. When this is taking place, the animals may be most uncomfortable unless they are given proper care; the rubbing posts and the manner in which caged animals use them are always interesting.

So varied are the markings of animals that one cannot help but assume that there must be some correlation between these and the environment in which the animals live. As a rule, the animals that live exposed in the open are uniformly colored, while those that live in an environment characterized by light and shade have pelts conspicuously streaked and spotted. Take a trip down the line of cages, if the animals are so confined, and form judgments as to the kind of territory in which the animals live; then, check your conclusions with the references in the insert in this magazine, or from other sources. Unless you use imagination, you will get comparatively little of the pleasure available from a circus or a zoo.

Of course circus and zoo provide an amazing mixture of sounds and smells. After you have gone down the line of captive animals, and have heard what they have to say, and have gotten a reasonable experience with the way they smell, let a friend lead you with your eyes shut to another part of the zoo where the same sounds and smells may be experienced. What luck do you have in identifying them?

There have been many attempts to interpret the sounds made by so-called dumb animals to determine whether they have a language. Some contend that apes have a reasonable vocabulary. This may be so, but to what extent can you interpret the sounds you hear in a circus or a zoo? Can you tell, from the sounds you hear, whether dinner time is approaching? Can you tell when an elephant resents having to obey a command? Can you read fear or challenge in the sounds made by horses, zebras, donkeys and their kind when they are confined to their stalls, or being cared for by their attendants?

Sanitation is always worth studying in any animal, and this is certainly true of animals forced to live in limited quarters. Even under these circumstances some animals keep themselves immaculate while others seem to be filthy at all times. Does either habit seem to be common with any groups of animals? That is, are the cats generally cleanly and the cattle otherwise, or how would you wish to make a generalization on this subject?

The food of these animals varies so greatly that it is reflected in the different structures of the animals themselves. Also, it is important in determining whether or not the animals can be maintained successfully under zoo or circus conditions. Giant pandas are popular animals but not many of them long survive conditions of confinement. This is probably associated with their food needs. Elephants, on the other hand, easily adjust themselves to food such as is eaten by horses, and so their maintenance is a relatively simple matter. The chart section of the insert will give, in some cases, the foods that the confined animals can eat as a substitute for their natural food.

Of course, it is to the interest of some circuses to make the people think that the animals they have on display are more ferocious and dangerous than they may really be, and, of course, a confined animal cannot be expected to behave normally. Somewhere between the advertised fierceness of the beasts and their apparent docility probably lies the true nature of the animals. It is for us who may visit the circus or zoo to try to get the correct picture. To do this, we have to be able, to some degree, to project ourselves into the background of the animal and of his ancestors. We have to get some idea of the treatment the individual has received from his keeper, and from those who view him. We have to understand what his natural reactions have to be to survive in the wild if we are even to approximate an understanding of what the animal we see is really like. True, these animals have eyes and teeth and feet and tails that vary, but more important than these may be their ability to react quickly and effectively to a new situation. A cat must act quickly or lose its supper when it is wild. This is not so true of an animal that feeds upon grass and is effectively protected from its enemies by the color of its coat.

Let us all try to get our school children who visit a zoo or circus to see in the animals of the menagerie something more than bored, flea-bitten, miserable members of the animal kingdom.

TO THE EDITOR

On Sportsmen

Dear Sir:

The cannonade starts soon after daybreak. An early riser, I step outside to listen. From all around this water-marsh-girdled city comes the rumble of thunder like distant artillery fire, punctuated by frequent sharp detonations, and a crackle as of machine guns, the volume of sound swelling and waning as fresh batteries go into action. No, war has not come to America. It is October 1, the opening of the duck season.

What price sportsmanship? About noon I walk down to the river shore, inside the city limits, where bewildered waterfowl seek sanctuary. A great blue heron, legs adangle, circles a quiet backwater and lands among the reeds. As I sweep the water with binoculars, suddenly I realize I am looking at the bodies of slain ducks. Out in mid-channel scores of dead wildfowl are floating by (bottoms up). A herring gull is at work with apparent difficulty in getting past the feathers to the meat.

Through this shambles, punts trailing astern, plows a succession of cabin cruisers full of brave hunters, in complete costume, returning from the morning's engagement. Reassured of their own vitality, convinced anew of their status as "sportsmen", these hairy-chested adolescents, who never grow up, are content. They have found and slaughtered a magnificent form of life, far more useful to the world than its slayers, but one without weapons or a chance to fight back.

ENOCH MORSE

We Thank You

Dear Sir:

As a teacher of young Americans—the Nation to Come—I can hardly tell you in a few words what NATURE MAGAZINE has meant to the hundreds of children and to me all these years.

Yes, they "jump" like the rabbit in that happy song—"If You Are a Rabbit." Wish you could have heard them sing it! And they always wait for the next OUR NATURE MAGAZINE. All the back numbers we have on file form a library we would not sell for many times the subscription price.

"Would the occasional use of songs be helpful in the school?" Ask our scholars! Did you hear their loud, "Yes"?

PAUL L. SCHAEFER

Forest Park, Ill.

PLANT LORE OF CHRISTMAS

(Continued from page 546)

who kept it in their houses as a safeguard against fire and to keep out evil spirits.

In time mistletoe became a merrier plant, although the early Christians clung to many pagan ideas about it. No one knows exactly how the traditional English custom of kissing under the mistletoe began. In olden days the maiden who was not kissed at least once during the Christmas season was supposed to have no chance of being married during the year. A large branch of the sacred plant was hung in a conspicuous place in every home, and a berry pulled each time a kiss was given. When there were no longer any berries there were no more kisses, and the mistletoe apparently lost its special effect.

In Germany it is said that if you will carry a spray of mistletoe to an old house the ghosts who live there will appear to you and, by means of it, you can force them to answer your questions.

In Sweden the peasants hang up bunches of mistletoe on the ceilings of their rooms as a protection against harm in general and fire in particular. The Swedes also think that if a spray of mistletoe is hung in a horse's stall, the trolls or evil creatures will be powerless to injure the beast.

Mistletoe is also said to afford efficient protection against sorcery and witchcraft. In Austria the peasants lay a twig of mistletoe on the threshold to prevent nightmare, doubtless believing it keeps out the evil spirits that might enter and cause bad dreams.

In the north of England it is well known that there is nothing so fatal to milk and butter as witchcraft. People say that if you wish your dairy to thrive you should give a bunch of mistletoe to the first cow that has a calf after New Year's Day.

Welsh farmers used to say when mistletoe was scarce, "No mistletoe, no luck," but if there was a fine crop of mistletoe they expected a fine crop of corn that year.

There are many superstitions concerning the medicinal use of mistletoe. In France amulets were worn about the neck to prevent sickness. In Sweden rings of mistletoe were worn for the same reason.

Mistletoe was named Lignum Sanctae Crucis, the wood of the Sacred Cross, by the old monkish herbalists. They said the Cross of Calvary was made of mistletoe wood. They prescribed mistletoe tea as an antidote for every poison and as a remedy for falling sickness. They also recommended that pieces of mistletoe be hung about the neck to ward off diseases.

PEDIGREE?

By TAAK

It had been a balmy day. One of those days that ends in a quiet, peaceful evening which lures one into no greater activity than, perhaps, a leisurely walk. It was just before the Angelus. The thrilling quiet was broken only by the birds chirping their goodnights, and an occasional laugh or bell. A glance down the street made me stop in wonder. What was that double object I saw moving toward me? At first I could not believe my eyes. But a further look confirmed my vision. Two cats, a Maltese and an Angora, were on a promenade. Side by side they proceeded until they were quite near me. Suddenly a dog that had been tumbling around a yard caught sight of his feline friends. One bark and a dash brought him across the street. With a hiss the Maltese scrambled up a tree. Not so the Angora. She simply arched her back and waited. While the dog barked and leaped at the tree, he succeeded only in extracting more hisses from the frightened Maltese.

Finding this futile, he turned his attention to Miss Angora. He barked, and barked again. No response. As he circled around her noisily, she simply turned, the better to keep an eye on him. Not a quarter of an inch did she lower her back. Not a hiss did she emit. This continued until the dog tired. He then returned to the lawn and muzzled his failure between his paws. Then and only then did the arched back lose its curvature. In unassuming dignity the Angora withdrew to her porch, quietly to enjoy the last warmth of a sun setting in all its glory.

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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 539)

any Christmas tree where readers are expected.

Discussions of feeding wildlife are particularly appropriate at Christmas time. The practice of putting out a Yuletide sheaf for the birds is an old one. If more common, it might lead to a great deal more enjoyment of wildlife about the home, and those who are interested in such activities will appreciate *The Audubon Guide to Attracting Birds,* a comprehensive work with especially valuable contributions by Roger T. Peterson and Richard H. Pough. As far as the birds are concerned, more than a Yuletide symbol is welcome. This guide can help make year-round efforts more practical.

The possibilities of human profit from bird attraction will for many years recall most vividly the experiences of Ada Clapham Govan and her inspired account of them in *Wings at My Window.* A year ago I remember recommending this book as a Christmas gift, a recommendation that as practiced by myself on several friends proved excellent indeed. Whether the recipients were more than passingly interested in birds or not, I found that *Wings at My Window* was read with excitement and inspiration and soon became a much-lent volume. This account of how a chickadee on the window sill of a sick room brought courage where there was only despair is in my opinion an outstanding contribution not only to the literature of birds but also to the literature of courage. For anyone who has not yet read it (and I make no exceptions) *Wings at My Window* is still a first choice as a Christmas gift.

Undoubtedly, however, the greatest of the books dealing with Nature that have come my way during the past twelve months is Donald Culross Peattie's *The Road of a Naturalist.* Dealing with American Nature as observed by, and interwoven with all the experiences of, Mr. Peattie, this book is one of the best examples I know of the use of writing to create a work of art. Since discussing it for the November magazine, I have read it again and in part aloud and have been more deeply impressed by its sensitive humanity and its apprehension of the sublime. All who are interested in human experiences and in the influences of Nature will value *The Road of a Naturalist* most highly, and for those who also have a taste for the art of writing, this book will approach the perfection that all who give gifts are constantly seeking.

These then are the books I shall list for those who ask me for suggestions on Christmas giving, all of which, incidentally, are conveniently available through the American Nature Association's book department.

The Audubon Guide to Attracting Birds. Edited by John H. Baker. Doubleday, Doran, and Co., Inc. $2.50.

John and William Bartram: Botanists and Explorers. By Ernest Earnest. University of Pennsylvania Press. $2.

The Lungfish and the Unicorn: An Excursion into Romantic Zoology. By Willy Ley. Modern Age Books. $2.75.

November Grass. By Judy Van der Veer. Longmans, Green and Co. $2.

The Road of a Naturalist. By Donald Culross Peattie. Houghton Mifflin Co. $3.

Sierra Outpost. By Lila Lofberg and David Malcolmson. Duell, Sloan and Pearce. $2.50.

Trail of an Artist-Naturalist: The Autobiography of Ernest Thompson Seton. Charles Scribner's Sons. $3.75.

Village Year: A Sac Prairie Journal. By August Derleth. Coward-McCann, Inc. $3.

Wildlife Conservation. By Ira N. Gabrielson. The Macmillan Co. $3.50.

Wings at My Window. By Ada Clapham Govan. The Macmillan Co. $2.50.

The Chinook

Return to the River. A story of the chinook run. By Roderick L. Haig-Brown. Illustrated by Charles De Feo. 250 pp., 16 illus., map. New York: William Morrow and Co., 1941. $3.00.

This is the absorbing yet accurate story of the chinook salmon of the Columbia River, written with rare beauty and with the suspense of a good story. The whole life of the salmon is here, from its first stirrings as an embryo deep in the nest, the journey to the sea and the years in the ocean. Then its return to its native river, surmounting obstacle after obstacle and running the gauntlet of hazards on the way. There are unforgettable details of the life of the rivers as well, the birds, the animals and the men who fish and who study the salmon. It is no sentimental lament for the glory of the great salmon runs as they once were, it is the story of today, the great dams and ladders on the Columbia, the salvage work at Grand Coulee and of the men who live by fishing for the salmon. The illustrations are in fine spirit with the text, as fine as Schaldach's famous etchings. This is a book that should not be missed by anyone interested in fine nature writing, for its author has that rare talent which has been the heritage of Englishmen since Isaak Walton for writing about fish and fishing.

Bird-Watching

Pageant in the Sky. By Raymond S. Deck. New York. Dodd, Mead and Company. 268 pages with illustrations by the author. $3.00.

"Just of themselves, birds are personable fellow-creatures. Their lives in many little ways parallel our own. According birds a place in the sun opens new vistas to the human mind. It lessens vain introspection. It makes men humble. Therefore birds are important to everyone."

This observation is from Mr. Deck's preface to a fine bird book; one in which he has developed the thesis in the quoted paragraph. The author has a rare combination of talents with which to work. He is a sincere bird student, a careful observer, an able writer, and an accomplished photographer. He has used all of these assets to produce a book that will delight all who have the least interest in birds, and, indeed, those who do not.

AMERICA'S LAST FRONTIER

(Continued from page 572)

der at will over the landscape. He will be absolutely confined to the roads and the developed areas. When he takes to a boat, he will not be able to wander from a marked course or venture far without a pilot. These are the reasons, then, why it seems to us that a park, if established, could be opened up so as to make adequate provision for the appreciation of the Everglades and all that the word includes and still further conservation of the unique flora and fauna to the utmost."

History reveals that most of our National Parks were not established even a year too soon. Strong demands are being made today by the lumber industry to slice off a portion of the recently-created Olympic National Park so that private interests can cash in on the higher lumber prices caused by the defense boom.

Some Floridians are sacrilegious enough to assert that even if there is oil under the Everglades—which seems very unlikely—the National Park should be established anyway. There are thousands of oil derricks in the land but only one Everglades, they argue. If its unique beauty is sacrificed for a few gallons of oil, we may ashamedly chalk up another victim for the insatiable octopus of commercialism, whose amazing tentacles extend from the Olympic forests of Washington to the southernmost Everglades of Florida.

OIL FROM BIRCHES

(Continued from page 554)

bearing catkins droop from each twig, and soon greenish-yellow pollen is scattered far and wide by the wind. A grove of these trees is easily detected, especially in the spring, by the strong wintergreen odor exuding from the bark; the twigs have a definite wintergreen flavor when chewed.

Second-growth timber is most frequently used for oil because the saplings have branches just the right size for the still box. Usually only the smaller limbs, seldom more than an ich and one-fourth in diameter, are used. Some operators, however, strip the bark from the trunk of the trees and larger limbs and use it after the rough outer portion has been scraped off. Birch oil is found only in the bark and growing tissues of the trees.

Owners are usually glad to dispose of these second-growth groves, since the wood is seldom of a quality to be used for furniture, agricultural implements, or woodenware, as some kinds of birch wood are, and it occupies ground that could support more valuable timber or crops. These "stills" really act as scavengers, clearing valuable land for more profitable growths of timber.

Indiana Year Book

As always the *Audubon Year Book* of the Indiana Audubon Society contains information of value and interest to bird lovers. Among the articles in the 1941 issue are "Some Birds of a California Citrus Ranch" by L. A. Test; "The Birds of Bonaventure Island" by M. S. Markle; "Bird-Banding Stations I Have Visited" by Dorothy Madden Hobson.

Useful Legumes

Legumes for Erosion Control and Wildlife. By Edward H. Graham. Washington, D. C. Superintendent of Documents. 153 pages with illustrations. Sixty-five cents.

In view of the now recognized interdependence of soils, vegetation and wildlife, it is important that information on the use of vegetation to conserve soil and provide habitats for wildlife be made available. In this publication the author, biologist of the Soil Conservation Service, presents valuable information for the farmer and soil conservationist.

Plant Identification

Tabular Keys for the Identification of the Woody Plants. By Florence B. Robinson. Champaign, Illinois. The Garrard Press. 156 pages. $2.50.

This compilation is designed for quick reference and for easy use in the field. To that end it is bound in a looseleaf form. The author seeks to present the material so that the student may be able to identify by external characteristics the five hundred trees, shrubs, vines, conifers and broad-leaved evergreens covered.

Insect Adventure

A Lot of Insects. By Frank E. Lutz. New York. 1941. G. P. Putnam's Sons. 304 pages. Illustrated. $3.00.

The author of this fascinating volume is Curator of Entomology at the American Museum of Natural History, and also author of that valuable work, *The Field Book of Insects,* which volume is an identification text. But in his present book the author tells the story of the insects that may be found in a suburban yard. It is, in fact, an outgrowth of the celebrated exhibit at the Museum showing the insect population of such a restricted area. It is the story of exploration and adventure within these small boundaries, which makes it all the more amazing. Anyone with the laboratory of such a suburban yard and with an inquiring mind can make similar expeditions, and, with Dr. Lutz's book as a guide, bring back as many results.

Conservation

Conservation of the Nation's Resources. By Harry E. Flynn and Floyd E. Perkins. New York. The Macmillan Company. 385 pages. Illustrated.

The authors, both Minnesota educators, have written a textbook for use in social science classes, or, when conservation is taught separately, in a course by itself. It is to be noted that this book deals with conservation of the "nation's" resources, not exclusively with the "natural" resources of the country. Thus the conservation of human resources is considered, as are health, safety and other matters. The inevitable result of such a broad field is, of course, a necessarily superficial treatment of the component parts of a large and complicated subject. However, this is an introductory text and as such is well enough presented to stimulate further study. The bibliography for additional reading leaves something to be desired, although inclusion of a film list of conservation motion pictures is an asset.

In Yosemite

Michael and Anne in the Yosemite Valley. By Virginia and Ansel Adams. New York. The Studio Publications, Inc. 64 pages. Illustrations. $1.50.

This is the picture-story of two youngsters in this lovely valley. Ansel Adams is the noted photographer of our western forests and mountains, and he has turned his lenses on Michael and Anne to produce a charming series of pictures, for which Mrs. Adams supplies the simple legends. The book will delight any adult or any child who has visited this National Park.

Juvenile Bibliography

A Bibliography of Books for Young Children. Revised edition compiled by May Hill Arbuthnot. Washington, D. C. The Association for Childhood Education, 1201 16th St. 76 pages. Fifty cents.

This is a revised edition that has been through three previous revisions and three printings, which proves its worth. While there are many bibliographies in this field, this one seeks to list those books that are worthwhile and that seem to hold promise of being of permanent value. The listing should be of value to parents, teachers and librarians.

The Third Year

The Gardener's Third Year. By Alfred Bates. New York. Longmans-Green and Company. 310 pages. $2.50.

This, as the title suggests, is the third book in "The Gardener's Year Series" written by the same author. This book which with its fellows makes up a practical set of garden books, deals with trees, vines and shrubs. It covers the merits of the various species, and their care and adaptation to special decorative purposes.

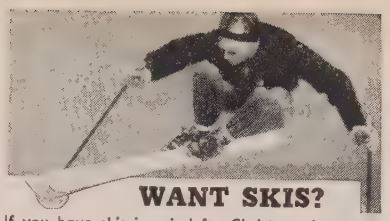
Pickwick Conference

The Fourth Session of the National Conference on Conservation Education and Publicity met at Pickwick Dam, Tennessee, on September 28, 29 and 30 with a record attendance of 65. Conservation educators and publicity writers from twenty-one states were in attendance, along with representatives of various Federal government conservation agencies. Among the topics discussed were "Conservation Projected through the Schools", "Conservation Publicity by Press and Radio", "The Use of State Conservation Magazines".

The Conference accepted the invitation of the Illinois Conservation Department to meet at Pere Marquette State Park in 1942. Officers chosen for 1942 were: John Halpin, New York Conservation Department, President; John Caldwell, Tennessee Conservation Department, First Vice-President; James Nally, Illinois Conservation Department, Second Vice-President; Townsend Godsey, Hollister, Missouri, Secretary-Treasurer.

Correspond?

Ralph Hadley, amateur naturalist of Lowry City, Missouri, would like to correspond with other amateur naturalists. He is interested in mammals, birds and reptiles, and particularly would like to get in touch with others having small natural history museums.



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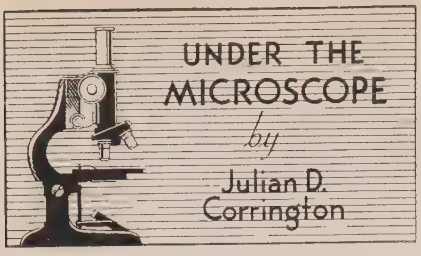


METALLOGRAPHY

I. APPARATUS

Among the non-biological fields where the microscope is of great importance is metallography, a word with two meanings. In older and more general usage the term denotes the science or art of studying and working metals, while more recently and in a more restricted sense, it designates solely the microscopy of metal structure.

Many readers, thinking metallography too difficult or abstruse, might feel inclined to pass up this chapter and in so doing would miss a most interesting and valuable experience. True, a certain amount of specialized knowledge and equipment is necessary, but as in most other lines of work, these may be as simple or as elaborate as one prefers. We propose, therefore, to give the elements of this subject in a series of three articles, the first on equipment, the second on preparation of material, and the last on study of the finished objects. It is in this last installment that information will appear as to the purpose and value of such investigations.

By way of introduction, the general method consists of cutting metal specimens to a convenient size, grinding until they are smooth and flat to the unaided eye, polishing until microscopically smooth, then etching the polished surface with either weak acids or bases. These reagents attack some of the constituents more than others and thus throw the crystal structure of various components into relief. Finally the specimens are studied under moderate magnification with reflected or vertical illumination, inasmuch as they are completely opaque to transmitted light, or are photographed and the prints or enlargements studied, or positives prepared as lantern slides for projection and consequent further magnification. Details of structure not at all visible by any other means become very clear and have greatly influenced the procedures of smelting, alloying, treatment, and utilization of metals.

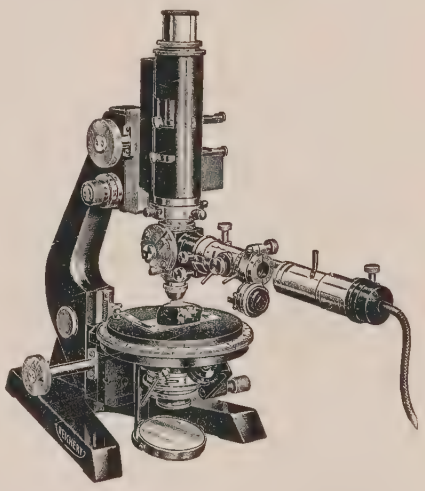
The time, patience and labor involved in preparing a good specimen is about equal to that expended on a whole mount of hydra or a parasitic worm, and considerably less than needed to turn out a histologic section.

Necessary apparatus for preparation of metal objects includes a hacksaw, or other cutting device, to procure blocks of suitable size and to give them a preliminary shaping: a file, or better, a series of files of increasing fineness, to be followed by such abrasives as carborundum or emery papers; and finally a chamois on which rouge is placed to provide the polishing medium. Details of these procedures will appear next month.

The most essential piece of apparatus, though, is connected with the study rather than preparation of the specimens, and concerns the illuminant to be used with the microscope. First, a word as to terms.

When rays of light are directed downward from a position above the stage, they strike the object at more or less of an angle, since the microscope tube would prevent them from being perfectly vertical. Some of these rays are then reflected by the polished object up the tube to the observer's eye, and the light is said to be *reflected* or *incident*. After this work was initiated, it was found possible, however, to send a beam of light into the tube itself, from the side, thence change it to the perpendicular by means of a mirror or prism, send it down through the objective to the object, from whence it is reflected back up the microscope to the eye. Such a method is termed *vertical illumination*. As a matter of fact, such rays are just as much reflected or incident as the oblique ones first mentioned, but by custom these words have kept the separate meanings here explained.

An ordinary gooseneck or student lamp can be used for simple reflected light, bringing the bulb to that height over the specimen and nearness to the microscope that seems to give best results in particular cases. Some amateur microscopes permit detaching the substage mirror and plugging it into holes in the pillar, above the stage, from which position it directs light downward upon the object. It is possible to rig a foun-

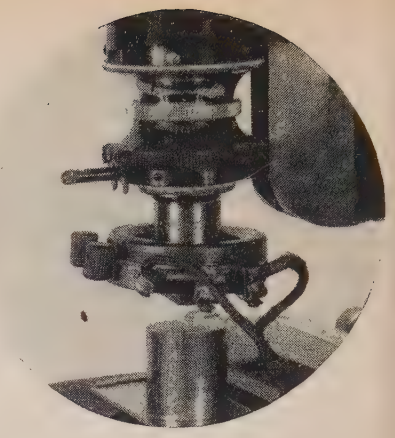


AN ELABORATE FORM OF VERTICAL ILLUMINATOR. COURTESY OF C. REICHERT, VIENNA

tain pen style of flashlight to the tube with tape or wire, or affix a vanity case mirror to the tube with a metal sleeve, and so obtain reflected light. Many similar devices will occur to those who give this matter some consideration.

The light source should be as powerful as possible. One of the best is a six-volt, concentrated-filament, auto headlight bulb, operating on the house current through a transformer. The arc light and pointolite sources also have many advocates, while various photoflood bulbs are excellent. The eyes should be shielded from direct exposure to such intense illuminants, and in every case it is decidedly preferable to buy or improvise a diaphragm and condenser for such a lamp. High power professional lamps have all of these features built in, and can be focused with a rack and pinion gear.

One of the finest light sources for reflected light is the Silverman illuminator. This has a small bulb in the form of a ring that, with its housing, is slipped around the



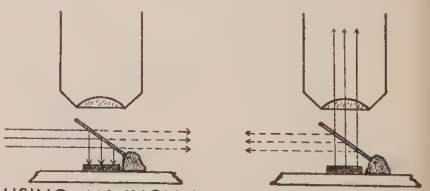
SILVERMAN ILLUMINATOR MOUNTED ON OBJECTIVE. METAL SPECIMEN IN FOCUS COURTESY SPENCER LENS CO.

objective like a collar, and concentrates a strong light on the object from every direction, uniformly diffuse and without shadows.

Commercial vertical illuminators are of numerous types, inserted between tube and objective. That shown in an accompanying illustration, typical of the more elaborate and expensive appliances, provides bright or dark fields and ordinary or polarized light, changing from one form to another by simple adjustments.

For low power work, sufficient for all but advanced studies, a very simple scheme may be employed to secure vertical illumination outside the tube entirely. One of our illustrations figures a cover glass inclined at a 45° angle and held by a lump of plasticene, situated on the stage, between objective and object. As seen in "A", a strong beam of light is directed upon this glass from the left side, some of the rays (broken lines) passing through and lost, others (solid lines) reflected downward upon the specimen. The result is shown in "B", although the pathways of both sketches are not separate in use; the polished metal specimen reflects the rays upward, and some will be reflected to the left (broken lines), back into the light source, while others (solid lines) will be transmitted, to pass up through the microscope tube to the eye. Only about 25% of the original light reaches the eye, hence the efficiency is low and the source must be powerful.

A collar or sleeve to hold such a cover glass, a small circular one preferred, can be attached around the objective. Those with mechanical skill may try their hands at making a more professional type by fashioning a small metal box, to be threaded at each of two ends and inserted between tube and objective. One side has a window to admit the light beam, while within a cover glass held at a 45° angle is cemented. A semicircular mirror, inclined at 45° may protrude halfway across the aperture, or a 45° prism may be used to accomplish the same ends with greater efficiency. Consult catalogs of optical companies for additional details.



USING AN INCLINED COVER GLASS TO SECURE VERTICAL ILLUMINATION

Beginner's Primer

In this survey of insect classification we have reached the terrestrial species of true bugs, Order Hemiptera, and must tread warily lest we bog down in the matter of identification. For the microscopist who is not especially concerned with entomology it is enough to be able to recognize such a bug on sight; those who wish more detailed information will need to consult one or more of the references given at the end of this article.

Of the many families, eight may be selected as being larger, more interesting, and more important economically. The leaf bugs (Miridae) constitute the most numerous in species of all families of the order, and its members are small to medium in size and include some bad plant enemies. Best known are the tarnished plant bug, *Lygus pratensis,* and the apple redbug, *Lygidea mendax.* The first is green to brown, with a yellow V behind the head, about one-fifth inch in length, and punctures flowers, as asters; vegetables, as celery; and fruit trees, as apple and peach. The second is a red insect that causes knots on apples by puncturing the young fruit.

In the Bedbug Family (Cimicidae), there are four American species, one each parasitic on poultry, swallows, bats and man. The common or human bedbug, *Cimex lectularius,* is about one-fifth inch in length, reddish brown, and with a rounded, much flattened body—a perfect size and shape for microscope slide whole mounts. This cosmopolitan pest is held in fear and contempt and, being secretive and nocturnal in habits and capable of fasting for long periods, is very difficult to eradicate when once established. The piercing-sucking mouthparts are well adapted to blood sucking, and in such instances there is always danger of disease transmission. The bedbug has been suspected in a number of cases, but definite proof is lacking.

The assassin bugs, of the Family Reduviidae, likewise include blood-sucking pests that may inflict severe wounds on man. In this country there is the masked bedbug hunter, *Reduvius personatus,* that sometimes stabs sleeping persons, and in the South the big bedbug, *Triatoma sanguisuga,* reaching a length of an inch. In South America, *Triatoma megista,* another of these "kissing bugs", is a carrier of Chagas disease, a trypanosome infection. A most curious member of this family is the wheel bug, *Arilus cristatus,* with a crest on the prothorax that resembles a cogwheel.

One of the most attractive of all insect whole mounts is made from any of several species of lace bugs (Tingidae), small creatures with a beautiful lace-like structure to the forewings, together with similar expansions on the prothorax. They occur in great numbers on the under sides of leaves of basswood, sycamore and other trees. Look closely at the lower surfaces of broad leaves and you will often find whole clusters of these tiny, whitish, fairy-like bugs, each with its beak imbedded in the plant tissues, sucking sap.

The Family Pyrrhocoridae includes the cotton stainers, fairly large and rather stout bugs, usually brown or black with red markings. *Dysdercus suturellus* is a common species that feeds on cotton bolls, into which it injects a microorganism that stains the fibers red. Another large family is that of the chinch bugs (Lygæidae), the most notorious species being *Blissus leucopterus,* widely distributed destroyer of grain. It is a small bug, only about one-sixth inch in length, and is black with white forewings.

Best known representative of the large Squash Bug Family, Coreidae, is *Anasa tristis,* a big fellow as bugs go, and brownish-black with yellow spots along the sides, yellowish beneath. This species has unwittingly carved a place for itself in the biological hall of fame by providing scientists with material for proof of the chromosome method of sex determination.

Perhaps most familiar to the average person is some member of the Stink Bug Family, Pentatomidae, the common name referring to specialized development of a habit of most bugs, that of secreting ill-smelling fluids to make them less palatable to their enemies, while the scientific name calls attention to the pentagonal body shape. Two species are worthy of separate mention. *Perillus bioculatus* destroys potato beetles and is hence a valuable ally of the farmer, while the harlequin cabbage bug or calico back, *Murgantia histrionica,* is highly destructive. It is a handsome insect, being black with red to yellow bands and stripes.

Among this whole assemblage, the smaller forms make good whole mounts, while larger species, especially in the last two families, provide material for mounts of antennae, mouthparts, wings and legs.

References:

Blatchley, W. S., *Heteroptera or True Bugs of Eastern North America.* Detailed, advanced taxonomy.

Comstock, J. H., *An Introduction to Entomology.* One of the most widely used advanced texts.

Comstock, J. H., *A Manual for the Study of Insects.* Briefer and more elementary than the preceding.

Lutz, Frank E., *A Lot of Insects.* An informal book on the insects found in a suburban garden.

Needham, James G., *Introducing Insects.* A book for beginners in insect study.

Trade Notes

For Christmas: Three new books are available as Christmas gifts for those interested in microscopy.

Microscope. Gage, Simon Henry, *The Microscope,* 17th edition. Reviewed in this issue. Comstock Pub. Co., Ithaca, N. Y., $4.00.

Microtechnique. Corrington, Julian D., *Working With the Microscope.* To be reviewed next month. Whittlesey House, McGraw-Hill Book Co., 330 W. 42nd St., New York City, $3.50.

Photomicrography. Allen, Roy M., *Photomicrography.* To be reviewed next month. D. Van Nostrand Co., 250 Fourth Ave., New York City. $5.50.

It is with especial interest that we announce publication of a new edition, the seventeenth, of *The Microscope,* by Simon Henry Gage. As many of our readers are aware, this is by far the best known and most widely used of all references on this subject in America. The new edition is a handsome volume, ably following in the noteworthy footsteps of its many predecessors.

The general plan of the book, having proved so successful, is retained, but every chapter has been revised and there are a number of excellent new illustrations.

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Among features incorporated for the first time are discussions of the electron microscope, polaroid material, high pressure mercury vapor lamps for ultra violet and photomicrography, and some of the new plastic substances that are replacing balsam as a mountant. Recent models of microscopes are figured, and there are new diagrams in connection with dark field and ultra violet microscopy.

For those unfamiliar with this work, we may add that it is intended for all adults, whether professional or amateur. The beginner can start from scratch and acquire advanced knowledge by mastering one chapter at a time. The book is very comprehensive, all phases of the subject being covered, such as theory of the microscope, dark field, polarized light, drawing, projection, photomicrography, microspectroscopy, microincineration, microtechnique and history. Pp. viii, 617; figs. 313. Comstock Pub. Co., Ithaca, N. Y., 1941. $4.00.

We are much impressed with a new work that presents the results of many years of research by E. C. Large, well known British writer and scientist. The author is a specialist in insecticides and fungicides, and has been a research chemist and industrial designer. He has two successful novels to his credit, *Sugar in the Air,* and *Asleep in the Afternoon,* both utilizing his special technical knowledge in developing very original themes. The new book, *Advance of the Fungi,* combines a witty and entertaining style with authoritative and well documented accounts of all the major species of fungi that attack the food plants of man.

Beginning with the Potato Murrain in 1845, the reader is carried through successive stages in man's conquest of the blights, mildews, molds and rusts, experiencing the thrills of discovery, and of participation in controversies and debates, meeting the people who have rendered great services to humanity. By going to such original sources as the newspapers and scientific journals of the time, the author makes his numerous topics live again, and one is impressed with the influence that these fungal pests have exerted upon the course of human history and the shaping of sociological institutions. We need only mention the effects on Europe in general and Ireland in particular of the great potato rot of the "Famished Forties", starving a million people, causing mass emigrations, changing laws and social structures, and altering the story of civilization. The illustrations consist of excellent line drawings and photographs and there is a comprehensive bibliography. Pp. 488; plts. VI, figs. 58. Henry Holt and Co., 257 Fourth Ave., New York City, 1940. $4.00.

One of the best written and most successful textbooks of zoology is Professor Michael F. Guyer's *Animal Biology,* and it is therefore a pleasure to review the new third edition. To those unacquainted with this work we may state that it is very comprehensive and fully illustrated. The 27 chapters are divided into six parts, taking up (1) living matter, organization of protoplasm, the cell, classification, adaptation, ecology; (2) representative animal types in detail; (3) the organ systems and their functions; (4) embryology and genetics; (5) evolution; and (6) survey of the animal kingdom.

The author will be known to microscopists through his widely used *Animal Micrology,* the nature of which, however, precludes exposition of his abilities as an interesting writer. In the zoology text the reader will find his style at all times both fascinating and scholarly. The approach is direct; the accounts of recent experimental work full and clear. In the new edition there is an important and entirely new chapter on ecology, revamped classifications of birds and mammals, inclusion of *Planaria* among representative animal types, a discussion of amoeboid locomotion, and a summary of recent work on mating types in *Paramecium.* The illustrations, an important feature of the book from the beginning, have been improved by addition of new ones.

This text is generally regarded as the best of those that incorporate the advantages of both methods of approach to the subject,—the types method and the principles method. A sufficient number of types are covered in detail, yet principles are stressed throughout. There is a list of reference books and a glossary. Pp. xix, 723; figs. 423. Harper and Brothers, 49 East 33d St., New York City, 1941. $3.75.

Man, the Mechanical Misfit, by Professor George H. Estabrooks, is a very stimulating and thought-provoking book by a noted psychologist. Centered around the thesis that man is degenerating and faces eventual extinction, there are discussions on a great many highly controversial subjects, in which the author emphasizes that the statements are his own beliefs and he does not expect everyone to agree with him.

The first two chapters sum up evolution from origin of the earth to appearance and domination of *Homo sapiens.* Some of the jumps taken are perhaps too great, but two billion years is a lot of time to cover in two chapters. Again, professional biologists can find some errors here, but the author specifically disclaims expert knowledge of so many fields, and picayunish criticism of detail would only show that the reader was missing the whole point of the book. The last five chapters are especially fine and advance very convincing arguments that man reached his peak some ten thousand years ago, that civilization is destroying him, that the brain is a vampire on the body, that there is nothing so insane racially as our individual sanity, that the physician is the best friend of individual man but the worst enemy of the human race and, finally, that extinction is certain. Readers could stage some fascinating debates on the race-suicidal pleasure principle, the declining birthrate of our best stocks, and the effects of wars.

Dr. Estabrooks gives us ten thousand years of further abode on this planet, so we need not worry for ourselves and can sit back and enjoy his engaging and often thrilling account. At the same time, mankind in general can plan to do something about it, and ways of at least postponing the inevitable are suggested.

This book should be read by everyone interested in anthropology, sociology, government, psychology, eugenics and by all students and teachers of biology. Pp. 251. The Macmillan Company, 60 Fifth Ave., New York City, 1941. $2.50.

A most interesting new botany is *The Plant World,* by Harry J. Fuller, of the University of Illinois. As an introductory college text, the first three parts, dealing with structure, physiology and classification, comprise material for a one-semester course, while for the full year, the fourth part, on time and space distribution, including evolution and ecology, may be assigned in addition. For the high school teacher, we can recommend this volume for source material or advanced assignment or reference, and finally for the mature layman, working alone, this is a desirable addition to the serious library, from which he may obtain a first-class knowledge of modern botany.

Written to teach botany for its cultural and general educational value rather than to train professional botanists, the style is direct and readable, the applications practical and the illustrations numerous and excellent. Each of the twenty-seven chapters is followed by a useful summary, and the glossary includes etymology. Pp. xi, 592; figs. 306, 2 colored plates. Henry Holt & Co., 257 Fourth Ave., New York City, $3.25.

The Microbe's Challenge is the provocative title that Dr. Frederick Eberson gives to his interesting and valuable popular discussion of man's contest with microbes; his success in drawing aside the veil of mystery about them; his triumphs and defeats in bacteriology, and his excursions into the field of microbiology. This is a book for the layman, and in setting out to write such a volume the author was confronted with obstacles that he has admirably surmounted. His success in this direction is undoubtedly due to the fact that he recognized the difficulties involved in such a work. This is, of course, a story of mystery and romance to the lay reader—mystery because it deals with a world unseen save through the microscope; romance because it is a story of scientific adventure. The book is published by the Jacques Cattell Press, Lancaster, Pa. 354 pages, with glossary and index. Price $3.50.

A. S. A. M. News

After a considerable amount of groundwork, a number of our members in Philadelphia have finally launched the Philadelphia Chapter and are now putting on a membership drive and laying plans for an active winter. Cyrus H. Chappell, 558 East Alcott St., mainspring in organizing this new Chapter, was elected President, and James W. Mitchell, 5128 Akron St., Secretary-Treasurer.

A number of meetings have been held, attended by the charter group of eleven members, at which George F. Stauffer, head of the Department of Science of Sharon Hill High School, has conducted a series of lessons on microscopic technique. The group has also been aided by W. Stephen Thomas, Executive Secretary of the Committee on Education and Participation in Science, of the American Philosophical Society of Philadelphia.

All members in the Philadelphia area, and all others who would be interested in affiliating, are urged to contact the Secretary. The new Chapter is the twelfth. Pennsylvania continues to maintain its commanding lead among states with A. S. A. M. Chapters, having five of the twelve. These, in the order of their founding, are located at Allentown, Johnsonburg, Bangor, Pittsburgh and Philadelphia.

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(*Gen.* indicates a general article; *fig.*, a photograph or drawing; *rev.*, a review.)

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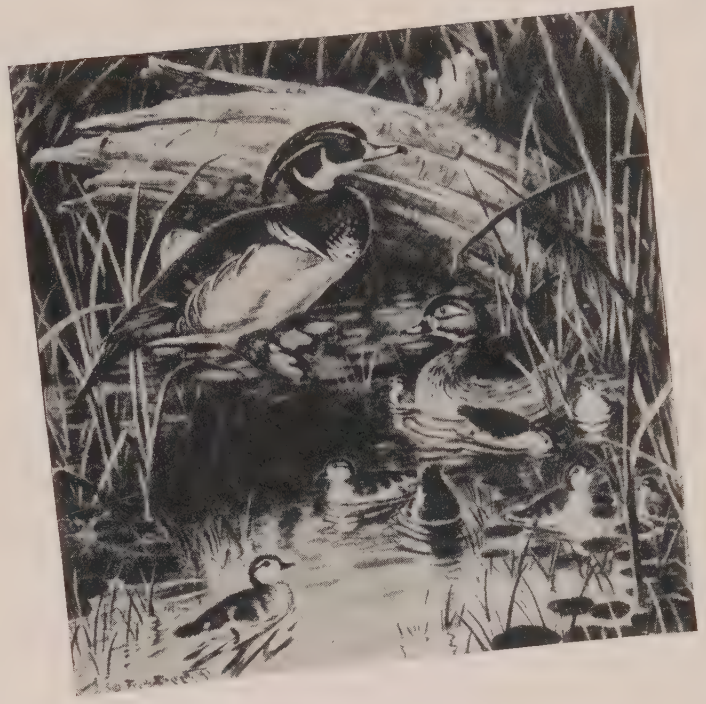
Meet Mr. and Mrs. Wood Duck - - -



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